Title: Room for chaos? : authenticity and performance in undergraduate spatial design students’ accounts of ideational work

Name Garry Jan Layden

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Room for Chaos?

Authenticity and Performance in Undergraduate Spatial Design
Students’ Accounts of Ideational Work

Garry Jan Layden

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in fulfilment of the requirements for the degree of
Professional Doctorate

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Director of Studies: Professor Patrick Carmichael
Author’s Declaration

I, Garry Layden, declare that this thesis and the work presented in it are my own and have been generated by me as the result of my own original research.

Title of thesis: Room for Chaos? Authenticity and Performance in Undergraduate Spatial Design Students’ Accounts of Ideational Work

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;

2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;

3. Where I have cited the published work of others, this is always clearly attributed;

4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;

5. I have acknowledged all main sources of help;

6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;

7. None of this work has been published before submission.

Garry Layden
Abstract

This study was prompted by my suspicion that spatial design undergraduates’ production of paper-based freehand sketches during design ideation was in decline. Seeking to find out why, I conducted video-recorded focused interviews with undergraduates from a range of UK spatial design degrees, during which we examined their sketchbook material and discussed their ideational activities (termed ‘ideational moves’). I subjected the data to a form of content analysis, but the outcomes appeared to contradict my initial premise whilst revealing that the interactions during the interviews between myself, the respondents and the sketchbook material (termed ‘discursive moves’) warranted examination. This persuaded me that the study’s focus should emerge through ‘evolved’ grounded theory rather than being stated *a priori*, which highlighted my presence in, and impact on, the data and prompted me to adopt a constructivist grounded theorising approach in combination with actor-network theory’s concepts of translation and circulating references. This study has thus been qualitative, relativist, iterative and multi-modal.

Grounded theorising led to the identification of a number of categories and sub-categories of ideational move across the sample, and indicated that the respondents had used a ‘core’ of each. ‘Core’ categories comprised: making paper-based ideational moves, carrying out research and using photographic material. Several respondents also evidenced producing digital imagery and physical models. ‘Core’ sub-categories comprised using paper-based freehand perspective sketches, sketch diagrams and word-based approaches, plus supporting visuo-spatial research. Several respondents also evidenced producing paper-based freehand plan, section and elevation sketches, plus collage. Grounded theorising also revealed that each respondent had utilised a different combination of sub-categories, with different degrees of connectedness. I did not set out to evaluate the design outcomes showcased, but, as a spatial design academic and practitioner, I felt compelled to. This led to the tentative conclusion that respondents who added to the ‘core’ of categories and sub-categories and worked with greater connectedness appeared to produce more thoroughly-considered work, whilst those who forsook the ‘core’ and worked with less connectedness appeared to produce
more unexpected results by allowing ‘...room for chaos...’: periods of confusion and surprise.

Regarding the discursive moves, grounded theorising indicated that the sketchbook material tabled by each respondent during the study was not one fixed thing, but an abstraction using placing-for and directing-to techniques to focus attention on certain ideational moves and away from others. This made the sketchbook material a performance within the network of human and non-human actors who, in effect, co-constructed it as a temporary reality without necessarily realising this. Research into sketchbook material appears to regard it, once shared with others, as having the candour of a secret diary, and as eligible for formative and summative assessment because it documents design process authentically. My study, whilst not claiming generalisability, suggests that this view should be challenged. The new knowledge is now informing my future teaching practice and will, I hope, prompt other academics to investigate whether their own students manifest similar outcomes and, through this, contribute to wider discussions on the formative and summative assessment of undergraduate spatial design development activity.
Acknowledgements

I extend my profound thanks to my Director of Studies, Professor Patrick Carmichael from the University of Bedfordshire for his wise, patient and inspiring counsel; to Doctor Mark Evans from the University of Loughborough for his extremely helpful comments on my draft thesis; to Professors Janice Wearmouth and Uvanney Maylor from the University of Bedfordshire for their advice when I encountered difficult procedural hurdles during this study; and to my examiners, Professor Heidrun Allert and Dr Tara Page, for their insightful and encouraging feedback. My gratitude also extends to Professor Trevor Corner from the University of Bedfordshire who assisted me during the early stages of my research, and to my fellow Professional Doctorate students, Pat Cooper and David Mathew, and my academic colleagues Beverley Bothwell, Dr Peter Dean, Dr Sarah Baker, Dr Sylvia Tzvetanova Yung and Dr Janet Emmanuel for their support over the last five years. My deepest and warmest gratitude, however, goes to my wife Kate and son John whose continued advice, encouragement and forbearance helped me to keep going through long and anti-social hours of work. Without Kate and John, this study would never have been completed.
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1.0 Introduction

1.1 Preamble

This chapter summarises the history of, and context to, the study, but it also includes definitions of certain terms which are used frequently within the thesis: ‘spatial design’, ‘design ideation’, ‘paper-based freehand sketches’, ‘sketchbook material’, ‘ideational moves’ and ‘discursive moves’.

1.2 History and context

I began this study believing paper-based freehand sketches were an essential tool for spatial design ideation even in a world in which CAD was playing a growing role, and sketchbook material formed a ‘signature pedagogy’ (Schulman, 2005, p. 52) that helped significantly to define disciplinary identity. Recent experiences teaching and external examining spatial design undergraduates at several UK higher education institutions had caused me to suspect the production of paper-based freehand sketches was in decline. Indeed, to quote an anonymous spatial design student from a university at which I was recently an external examiner:

‘Some people like to draw by hand, some people like to make models, I like to use the computer.’

This unnamed student appeared to regard these approaches as options of broadly equal value, and had chosen to work digitally, whilst I saw paper-based freehand sketching as the *sine qua non* for all spatial designers.

I began this study as an investigation into the suspected decline. As my work progressed, however, it underwent significant changes: to the focus of the inquiry, methods of data presentation and analysis, and conceptual framework utilised for deeper analysis. Certain

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1 See section 1.4 ‘Paper-based freehand sketches’ for definition.
2 See sections 1.2 ‘Spatial design’ and 1.3 ‘Design ideation’ for definitions.
3 See section 1.5 ‘Sketchbook material’ for definition.
essentials endured (the emphasis on undergraduate spatial design students’ approaches to ideation; primary data collection methods; and qualitative, relativist, constructivist, reflexive approach), but, at its conclusion, the study has become somewhat different from what it was at its outset. I now regard these transformations as translations (Law, 2007; Latour, 1999; Callon, 1986) but, when I began my research, this concept was unknown to me.

Oppenheim (1992) advises that the researcher, following a literature review, and having decided on the initial ‘…conceptualisation of the study…[and its] design…’ (ibid. pp. 7-8) determines ‘…which hypothesis will be investigated…[and makes this] specific to the situation (that is…operational)’ (ibid.). At the start of this study I devised an initial hypothesis, aim and objectives, informed by background reading (see chapter 2.0 Literature review). These were as follows:

Hypothesis

Many spatial design practitioners regard the production and use of paper-based freehand sketches during the ideation stages of a typical project⁴ as important – even essential – in order to understand the challenges thoroughly and explore possible solutions imaginatively, swiftly and comprehensively. However, informed by professional experience as a spatial design tutor, external examiner and registered architect, and by underpinning reading, I am concerned spatial design undergraduates’ engagement with this process appears to be declining. Research into this field has been carried out, but I believe there is a need to investigate further in order to answer the following questions: why does the use of paper-based freehand sketches by spatial design undergraduates appear to be declining, and how does this compare across a range of academic levels (ie: year groups) and a variety of institutions?

⁴ Project-based learning is regarded as offering a number of benefits: it uses a broadly problem-focused approach to replicate key elements of the professional world and encourage participants working individually or in groups to learn through experience (Donnelly and Fitzmaurice, 2005); it frequently involves challenges that are open-ended (ibid.); and it is student-focused, seeking to foster a sense of personal ownership of the work being carried out (de Graaf and Kolmos, 2007). During the course of twenty-five years spent teaching spatial design undergraduates I have written numerous project-based assessment briefs, tutored many students as they tackled these and assessed both formatively and summatively a considerable amount of project work. Furthermore, having been a spatial design external examiner for almost seven years I have encountered a many examples of project work produced by students at other institutions. Krajcik and Blumenfeld (2006) provide a helpful review of the theoretical background to project-based learning and Donnelly and Fitzmaurice (2005) provide helpful insights into the roles of the tutor and the students. These texts focus on teaching, but not the teaching of spatial design undergraduates per se. However, that is not a concern here because my intention is not to argue the case for project-based learning in spatial design higher education but to ensure that when the word ‘project’ is encountered in this thesis it is understood clearly and consistently.
Initial aim

- To investigate the use by undergraduate spatial design students of paper-based freehand sketching in support of their design project work in order to ascertain why it appears to be declining.

Initial objectives

- To investigate how undergraduate spatial design students from a range of academic levels at a variety of institutions document design ideation in their sketchbooks in support of their design project work.
- To investigate how undergraduate spatial design students from a range of academic levels at a variety of institutions account for (ie: describe, explain and justify) the paper-based freehand sketches they use in support of their design project work.

The research participants I defined as level 4 to 6 (year 1 to 3) students from a range of spatial design courses at a range of UK higher education establishments (including my own). The primary data comprised video-recordings and transcripts of focused interviews involving myself and the participants. These sought to document spoken accounts during which the ideational moves used in support of developmental work on a selected design project were discussed, together with the sketchbook material tabled by the students. Initially, I examined the data using a form of content analysis. During the main study this revealed the following:

- What appeared to be strong evidence of the abundant use, by the respondents, of paper-based freehand sketching during ideation.
- That the respondents were selecting from what appeared to be the same basic pallet of ideational moves, but using them in different combinations, with different frequencies, and with different levels of connectedness.
- That the discussion of sketchbooks in a focused interview setting needed in itself to be examined as it appeared not to be a source of objective, comprehensive, unedited data.
After a lengthy period of reflexivity, I determined the study needed to be reconfigured; the original hypothesis, aim and objectives were ‘false starts’ (Orona, 1990, in Strauss and Corbin, 1997, p. 173) and the focus needed to be found through ‘evolved’ grounded theory rather than being stated a priori. This resulted in the study being reconfigured as a series of research questions:

- Which ideational moves\(^5\) were used by spatial design undergraduates and why did they use them?
- How frequently did each spatial design undergraduate use each of these ideational moves and what appeared to be the reasons for this?
- What degrees of connectedness between ideational move were manifest in each interview and what appeared to be the reasons for these?
- What patterns of ideational move use were manifest and what appeared to be the reasons for these?
- What discursive moves\(^6\) did each respondent make during the discussion of their ideational work and what were the apparent reasons for these?
- How did the above compare across the sample and for what apparent reasons?

‘Evolved’ grounded theorising brought into focus my presence in, and impact on, the data, which led me to adopt a constructivist grounded theory approach, which, in turn, persuaded me to utilise certain elements of actor-network theory (ANT) to conceptualise the study.

1.2 ‘Spatial design’

Much has been written about the nature of design and designing and there are numerous texts available to the reader wishing to learn more (for example, see Cross (1996), Jones (1992) and Archer (1968)). It is not my intention to summarise that material here but to clarify the undergraduate disciplines with which this study is concerned. During the background reading I found ‘design’ was used to designate a range of different academic disciplines, including

\(^5\) See section 1.6 ‘Ideational moves’ for definition.
\(^6\) See section 1.7 ‘Discursive moves’ for definition.
interior design, architectural design, graphic design, fashion design, product design and industrial design, all of which may require students to produce paper-based freehand sketches. However, this study grew out of my professional experiences as a registered architect and a senior lecturer in interior design and is intended to inform my professional future. It therefore focuses on the design of the built environment. As a consequence, I sought primary data from interior architecture, interior design and architecture undergraduates. I accept it may also have been valid for me to seek these from students on other built environment degrees, such as Architectural Studies, Architecture (Urban Design), Architecture with Interior Design and Interior Spatial Design. Because of the limited time available, I was not able to do this. For convenience, I use the phrase ‘spatial design’ in this thesis to denote courses that concern the design of the built environment. I am not arguing that these are in effect all the same course, but that each requires its students to, inter alia, carry out design ideation (see below for a definition of this term) in order to attempt to produce imaginative responses to the needs of building users and makers whilst dealing with a range of constraints and opportunities including site and context, function, construction, environment and budget. I accept the term ‘built environment’ could have been used instead as it appears to have wide currency across architecture, urban design, anthropometrics and ergonomics, construction, economics and research methods (for example, see Ahmed et al, 2016; Griffiths, S. and von Lünen, A. (eds.), 2016; Obeng-Odoom, 2015; Nussbaumer, 2014; Topliss, 2013; Hensel, 2012; Chapman, 2006). However, I have rejected this term for three reasons: firstly, I expected some of my respondents' sketchbook material would concern the design of three dimensional physical objects that did not relate to the built environment per se (this was indeed the case: certain respondents showed design proposals for products and installations); secondly, I hoped this study's consideration of sketchbook material discussed in an interview setting would be of interest to academics and practitioners whose work has spatial characteristics but is not concerned with the built environment (for example those involved with fashion design, set design, animation and installation art); and, thirdly, I wished to use a term that included the word ‘design’, and regarded 'built environment' as possibly implying erroneously a focus on construction and physical context.
1.3 ‘Design ideation’

This term emerged from my background reading into design and designing. Because of limited space, this thesis does not provide a comprehensive definition of these words but instead summarises Pei’s (2009) review that defines them, considers them within the context of a range of ‘idea-based disciplines’ (Pei, 2009, p. 15) and contrasts these with the approaches found within art and science. Pei also discusses the social, practical and economic benefits of design, along with its focus on problem solving and the weighing up of aesthetic and practical considerations, and he notes that, as design is open-ended, poorly structured and not leading to right-or-wrong solutions, designing requires the use of iterative approaches that are systematic but also involve trial-and-error (Pei, 2009). Imaging and representation (ie: sketching, drawing and model-making) he describes as playing pivotal roles in designing, as tools for communication with oneself and others, and to help define the problem, explore possible outcomes and move towards a viable solution (ibid.). Pei also discusses left- and right-brain thinking, divergent and convergent thinking and how these are integral to designing. He follows that account with a review of several models of the design process that describe it as a series of steps, activities, stages or phases, plus a description and comparative analysis of five distinct categories of design model which he identified in the literature (ibid.). These categories are summarised here because they informed my initial deliberations on which parts of the design process might be relevant to this study and the vocabulary that I decided to use to denote them, and because they presented me with two challenges. Firstly, let us consider these models in terms of their basic steps, activities, stages or phases:


French’s (1985) model: ‘Problem Definition’, followed by ‘Formulating Solutions’ and ‘Developing Solutions’

Archer’s (1965) model: ‘Data collection and Analysis’, followed by ‘Synthesis’ and ‘Development’
Pahl and Beitz’s (1996) model: ‘Clarification of design task’

Pugh’s (1991) model: ‘Design specification’

(Pei, 2009, p. 36)

Loughborough University’s Design Practice Research Group, meanwhile, divides the design process into four stages: ‘Concept’, ‘Development’, ‘Embodiment’ and ‘Detail’ (Design Practice Research Group, 2017); the Royal Institute of British Architects (RIBA), in its Plan of Work, places various design stages (‘0 Strategic Definition…1 Preparation and Brief…2 Concept Design…3 Developed Design…[and] 4 Technical Design…’) within a larger process that also includes constructing, running, and caring for buildings (Royal Institute of British Architects (RIBA), 2013); Goel separates designing into four phases: ‘problem structuring’, ‘preliminary design’, ‘design refinement’, and ‘detailing’ (Goel, 1995); and Hastings describes designing as a ‘…multi-step…process [which] generally includes observation, research, ideation, prototyping, testing, implementation, and review.’ (Hastings, 2013, p. 59) Whilst it is not intended to critique these models in-depth here, it is necessary to note that they present this study with a challenge because, although they can give the practitioner an indication of what might need to be done at a given moment in a design challenge, it is clear that during that given moment the act of designing may involve creative activity anywhere on a spectrum between open-ended conceptual speculation (‘Concept’) and detailed thinking on a range of functional, constructional, environmental, economic, legislative, contextual and other matters (‘detail’). Indeed, during design, analysis and synthesis can be inseparable (Jonson, 2004). Spatial design project briefs set within an academic context can, of course, be structured to follow one or another of the models outlined above, but students may be even more likely than practitioners to produce paper-based freehand sketches at unexpected times as they learn new processes and skills. Thus, an investigation into sketches produced in order to explore design ideas may miss important data if its focus is limited to, say, Pahl and Beitz’s ‘Conceptual Design’ phase, because such sketches may also be produced at other points during the design process.
The second of the challenges mentioned above is created by the variety of words and phrases used to denote the early stages of a design challenge. Pei’s (2009) models arguably include up to nine distinct labels, but a broader review of the underpinning literature reveals an even wider range: ‘front edge process’ (Goldschmidt, 2003, p. 72); ‘conceptualisation process’ (Jonson, 2004, p. 237), ‘concept generation’ (Jonson, 2004, p. 106, citing Pipes, 1991), ‘conceptual design stage’ (Jonson, 2004, p. 24; Lim et al, 2004, p. 393); ‘conceptual designing’ (Bilda et al, 2006, p. 587); ‘design ideation’ (Jonson, 2004, p. 108); and ‘ideation stage’ (Jonson, 2004, p. 229); ‘early design process’ (Monteiro de Menezes, 2004, p. 258); and ‘preliminary design’, ‘sketch design’ and ‘sketch scheme’ (used by myself when teaching spatial design, having learnt these terms whilst studying architecture). Of these, I regard ‘conceptualisation process’, ‘concept generation’, ‘conceptual design stage’ and ‘concept’ as unsuitable for this study because a spatial designer’s early ideation work may not only address the conceptual but a range of other matters. The term ‘front edge’ I regard as unsuitable because, although Goldschmidt (2003) uses it, it appears not to be widely-used elsewhere. ‘Sketch’ and ‘sketch scheme’ I see as unsuitable because ‘sketch’ has other connotations (see definition below) that may cause confusion during this study. ‘Early design process’ I think unsuitable because it is too vague. ‘Preliminary’ I deem unsuitable because, as I have noted, design development work can take place at various stages of a design challenge, but preliminary could suggest only activities carried out during, say, Pahl and Beitz’s (1996) or Goel’s (1995) ‘Preliminary design phase’. To avoid this potential for confusion, I use the phrase ‘design ideation’ in this thesis to denote the process of generating, exploring, evaluating and explaining ideas using paper-based freehand sketching and other ideational tools, whether that process takes place at a chronologically or developmentally early stage in a project or later on. I regard this phrase as a suitable because, without indicating any specific step, stage or phase, it signifies the process by which ‘…designers generate and develop intuitive or rational responses to design tasks and then explain and communicate emerging ideas as concepts and data through a variety of means, such as words, sketches or diagrams.’ (Jonson, 2004, p. 108) Moreover, in my view, it suggests the ideational task could occur during any moment.
1.4 ‘Paper-based freehand sketches’

This term (used throughout this thesis except, to reduce wordiness, in chapter and section headings) was prompted by my realisation during the preliminary literature review that academics, practitioners, undergraduates and researchers tend to use a wide variety of words and phrases to signify the kinds of drawing (both verb and noun) I originally set out to investigate. This includes: ‘sketches’ (Stones and Cassidy, 2010, p. 440; Prats et al, 2009, p. 503; Schenk, 2005a, p. 18; Bilda and Demirkan, 2003, p. 28; Kavakli and Gero, 2001, p. 347; Suwa and Tversky, 1997, p. 1) and ‘sketching’ (Jonson, 2004, p. 2); ‘handmade sketches’ (Pei, 2009, p. 131); ‘manual sketches’ (Pei, 2009, p. 134); ‘free-hand sketches’ (Prats et al, 2009, p. 503; Bilda and Demirkan, 2003, p. 28), ‘freehand sketches’ (Schenk, 2005a, p. 18; Suwa and Tversky, 1997, p. 1), ‘freehand sketching’ (Jonson, 2004, p. 23) and ‘freehand design sketching’ (Dulaney Jr. and Lyn, 2010, p. 285); ‘design sketching’ (Evans and Aldoy, 2016, p. 2); ‘hand sketching’ (Dulaney Jr. and Lyn, 2010, p. 282; Goldschmidt, 1991, p. 123); ‘freehand drawing’ (Jonson, 2004, p. 2); ‘hand drawing’ (Dulaney Jr. and Lyn, 2010, p. 282; Goldschmidt, 1991, p. 123); ‘hand media’ (Dulaney Jr. and Lyn, 2010, p. 282); ‘initial sketches’ (Wylant, 2008, p. 12); ‘preliminary sketches’, ‘thumbnail sketch[es]’, ‘quick roughs’ and ‘diagrammatic sketches’ (Schenk, 2005a, p. 18); ‘the traditional sketch’ (Jonson, 2004, p. 123); ‘the traditional pen and paper sketch’ (ibid.); ‘paper based sketching’ (Lim et al, 2004, p. 393); ‘paper-based drawing’ (Schenk, 2005a, p. 13); ‘sketcherly ways of designing’ (Jonson, 2004, p. 2); ‘partial and rudimentary representations’ (Goldschmidt, 2003, p. 1); ‘a rough, preliminary mark-making activity’ (Stones and Cassidy, 2010, p. 440); ‘rough sketches’ (Stones and Cassidy, 2010, p. 442); ‘[r]aw sketches’ (Lim et al, 2004, p. 394); ‘study sketches’ (Pei, 2009, p. 163; Goldschmidt, 1991, p. 123); ‘personal sketches’ and ‘idea sketches’ (Pei, 2009, p. 162); ‘referential sketches’ (Pei, 2009, p. 164); ‘[e]xternal representations’ (Salman, 2011, p. 15); ‘model[ing] graphically’ (Garner, 1999, p. ix); and, simply, ‘drawings’ (Tversky, 1999, p. 2; Goldschmidt, 1991, p. 123). I believe this variety needs to be approached with caution for two reasons. Firstly, it is possible that the different terms may not mean the same thing. For example, a ‘thumbnail sketch’ may generally understood to be a small, diagrammatic freehand representation (South, 2016) but it is my experience as a design tutor that the phrase may also denote, colloquially, somewhat larger and more detailed images and, whilst Schenk (2005a)
quotes it as having been used by an unnamed graphic designer, the sketches that person produced are not illustrated in her paper and cannot be judged. In addition, although I am familiar with the words ‘rough’ and ‘preliminary’ being used within the context of design ideation, and ‘mark-making’ within the context of freehand drawing, Stones and Cassidy (2010) use them to indicate an interpretive graphic design ideation exercise that incorporates both freehand and digital media. Furthermore, it is arguable that, whilst ‘partial and rudimentary representations’ could be sketches they could be exploratory and conceptual models, and that ‘modeling graphically’ could indicate the use of digital media. It may be contested that these expressions all mean basically the same thing and we all know what that is, but Schenk confirmed to me personally:

‘...defining terminology is a real problem in design-based subjects because terms are loosely and inconsistently applied. The word ‘sketch’ is the usual opt out term applied, and consequently rather useless in defining and differentiating drawings.

The distinction I make is between paper-based and computer-aided, or screen-based drawing because, of course, Wacom pads and such like, mean that digital drawings are hand drawn.’ (Schenk, personal communication, 2012)

Uncertainty or confusion about the meanings of words and phrases used in a given paper may not cause a researcher a problem if reading the paper results in clarity. However, as I have noted, the variety of terms encountered should be approached with caution for two reasons. The second of these concerns the terminology in my thesis. In reviewing the variety of words and phrases used by others to signify the kinds of drawing investigated in this study my intention was to find a sufficiently clear term that I could employ consistently. Whilst I welcome Schenk’s suggestion, I regard it as not providing the clarity I need because it does not distinguish between paper-based freehand drawings produced during the ideation stages of a design challenge and those produced later on with the aid of straight-edges. I regard the term ‘paper-based freehand sketches’ as providing greater clarity because ‘paper-based’ indicates that it excludes the digital realm and ‘freehand sketches’ that it concerns drawings produced
without the aid of straight-edges. My intention here is not that this phrase becomes adopted by industry and/or academia but that it can be understood by most readers.

1.5 ‘Sketchbook material’

For many years, artists and spatial designers have used the sketchbook as a place to generate, develop and interrogate ideas. Frequently, sketchbooks are private places where speculative and experimental work can be carried out and mistakes made in relative safety (V&A, 2017; Gant, 2015; Simcoe, 2010a; Simcoe, 2010b). The term suggests the container of this work will be some kind of portable bound book and the work will comprise paper-based freehand sketches, but what makes a sketchbook is debatable, and we are cautioned that

‘[s]ketchbook’ can be…misleading…It implies a collection of freehand drawings of buildings (or other subjects) made with pencil, pen, watercolour or any other portable medium. Sketchbooks are often more than that…” (V&A, 2017)

The primary data obtained for this study supports the V&A’s view: although each respondent brought one or more portable bound books containing sheets of paper, these had been used in a range of different ways and in some cases had been customised. For example, the temporary non-availability of one of respondent 05’s larger sketchbooks meant that she used a smaller one to fulfill the functions that she had assigned to the larger one; and respondent 09 modified her small, portable sketchbook by adding flaps thereby increasing the available sketching area. In an academic context all of these collections of ideational work may be given the same name – ‘sketchbook’ – and may well have performed the same role for the respondent, but they were not all the same thing. Because the word ‘sketchbook’ provides room for confusion I have chosen to use the phrase ‘sketchbook material’ in the thesis. Sketchbook material may denote one or more hard-copy books containing paper-based freehand sketches, or loose material, or a combination of loose material and hard-copy books, plus various forms of customisation. It is thus a more appropriate term to apply to the data obtained during this study.
1.6 ‘Ideational moves’

This term is used as a compound noun a great deal in the thesis, so it is important to define it before going any further. In section 1.3 ‘Design ideation’ I described the process of attempting to produce imaginative responses to the needs of building users and makers whilst dealing with a range of constraints and opportunities, including site and context, function, construction, environment and budget. I noted that this process is typically characterised as a sequence of steps, activities, stages or phases; as being open-ended, poorly structured, not leading to right-or-wrong solutions; and as requiring the use of iterative approaches that are systematic but also involve trial-and-error (Pei, 2009). It is clear that, in this thesis, I need a term to bracket the various sketchbook-based activities – for example, paper-based freehand sketching, model-making, precedent research and digital drawing – which take place during design ideation. My choice, ‘ideational move’, was guided by a number of publications. Bilda et al (2006) refer to a range of ‘…action categories: visuo-spatial actions, perceptual actions, functional actions, conceptual actions, evaluative actions and recall actions’ (Bilda et al, 2006, p. 5), and use a fine-grained analysis of the ideational process, informed by Bilda and Gero (2004), which includes: ‘…Regenerate a design image, or state of affairs…Maintain the image in the previous segment, and inspect…[and] Relocate a part/boundary or perform a geometrical/3D operation on a design image’ (Bilda and Gero, 2004, p. 125) Because Bilda et al’s (2006) study focuses on the sketching and mental imaging processes, I have concluded that the word ‘action’ is inappropriate for use as a noun to denote the much wider range of sketchbook material I am exploring.

As discussed in chapter 2.0 Literature review, Jonson’s (2004) study has certain overlaps with mine. His analysis focused on his participants’ design conceptualisation tools as follows:

‘…any freehand drawing including doodling were considered to be sketching [S]. Words [W] meant both spoken and written…[plus] Library and Internet searches…Any activity involving direct manipulation of materials…was categorised as modelling [M]. Any digital work…was classified as computing [C].’ (Jonson, 2004, p. 169)
Jonson employs the term ‘ideation move’ (Jonson, 2004, p. 185) to denote his participants’ use of these conceptual tools: thus, the production of a paper-based freehand sketch, carrying out of library research, or construction of a physical model would all be the making of an ideation move. I am attracted to this definition because, whilst its inclusiveness does not mirror exactly what I saw evidenced in my respondents’ sketchbook material, it comes close to it. Also, I appreciate the word ‘move’ because it is active – it implies traveling, even if mentally, from one place to another – and it does not imply overlap with Bilda et al’s (2006) and Bilda and Gero’s (2004) ‘action’ as discussed above. I have changed Jonson’s term from ‘ideation move’ to ‘ideational move’ because I regard ideational as an adjective characterising what kind of move is being made, and therefore more precise.

Thus, to summarise, all of the following are regarded as ideational moves within this thesis: paper-based freehand sketches (diagrams, plans, sections, elevations, perspectives, paraline projections); visuo-spatial and non-visuo-spatial research; word-based approaches (text used as annotation or stand-alone; text that is hand-written or printed); collage; photographs produced by the respondent (those produced by others would constitute visuo-spatial research); CAD drawings; physical models; the use of real materials; and chance encounters through an experiential, sensorial approach.

1.7 ‘Discursive moves’

Like ‘ideational move’, this term is also used as a compound noun a great deal in this thesis, so it needs to be defined. My appreciation of the word ‘move’ was discussed in section 1.6 ‘Ideational moves’ and remains applicable here. Primary data for this study were obtained by means of a programme of focused interviews (see chapter 4.0 Research methodology). For most of the time during these, the respondents tabled sketchbook material they had brought, and discussed this, apparently in response to my asking questions listed in my interview schedule (see section 6.7 Conducting the interviews), or subsequent questions prompted by what I saw and heard during the interview. An example is shown below:
GL ‘And what have you got there?’

11 ‘That was inside the building, just a piece of machinery that I quite liked…’

(see Appendix C, page 20)

These exchanges I regarded as straightforward question-and-answer discursive sequences during which I requested information from the respondents, and they appeared to attempt to provide that information. On occasions, however, it appeared that those same respondents were seeking to influence the course of the interview by making one or more unprompted interventions. For example, they appeared to be directing my attention to a particular item of sketchbook material: ‘[11 points to the perspective sketch of the building]’ (see Appendix C, page 22); turning from one page of sketchbook material to another: [11 turns a page (more of a flap, really) to reveal 1 paper-based section through the building created using needle and thread to show basic outlines, marked-up with broken lines and with certain dividing walls highlighted] (see Appendix C, page 22); indicating the need to add sketchbook material that did not currently exist: [There is also 1 coaster containing the words, ‘add pic of metal roof’] (see Appendix C, page 25), and 11 ‘I find that I prefer it when there’s already something on the page and then I can then go back to it, just add in the little bits…’ (see Appendix C, page 21); provide information on ideational moves that I had not requested, such as an overview (11 ‘There will be more…that will come…’ (see Appendix F, page 83)), a critique (11 ‘…A month and a half in…See this is just more images…’ (see Appendix F, page 88)) or evidence of support received (07 ‘…And then we had…lectures with our…tutors on just…basic uses of CAD…just making like squares and circles…’ (see Appendix E, page 69)); or, not answer a question I had asked:

GL ‘…And you had some perspectives here, do they follow-on from…the sketch views?’

07 ‘…Diagram of the area.’

[Then he shows prints of 2 digital plan drawings.]
It will be noted that these interventions may be physical, spoken or in the form of annotations to sketchbook material. It may seem contentious to categorise such apparently disparate data as, overall, the same thing, but I shall address this matter in section 8.6 Discursive moves – analysis of ‘timeline’ diagrams.

To return to my discussion on the word ‘move’, Kavakli and Gero (2001a and 2001b) use this regarding the spatial design process, but they do so in a way that is significantly different from mine, distinguishing between actions – for example: D-actions are drawing actions (comprising, *inter alia*, ‘Dc: create a new depiction…Drf: revise an old depiction…[and] Dwo: write words…’ (Kavakli and Gero, 2001a, p. 3)) – and moves – for example: M-actions are moves (comprising, *inter alia*, ‘Moa: motion over an area…Mod: motion over a depiction…[and] Ma: move a sketch against the sheet beneath’ *(ibid.*)). For these authors, an action denotes a sketching activity (echoing Bilda et al’s (2006) and Bilda and Gero’s (2004) studies) whilst a move denotes the participant’s hand traveling through space. Thus, in comparison with my study, Kavakli and Gero (2001a and b) appear to be defining actions as *a limited number* of ideational moves, and moves as *a limited number* of discursive moves. I do not find these limitations helpful as they do not allow the complexity of the discussion on sketchbook material to be examined and understood clearly.

### 1.8 Thesis structure

It will be seen from the above account that, overall, my approach has gone through a series of changes – which, as mentioned, I am calling translations (Law, 2007; Latour, 1999; Callon, 1986) – including the data analysis and its presentation; approaches to theorising; conceptualisation; and conclusions drawn. In order to allow this changing, iterative nature to be understood, I have structured the thesis as follows: chapter 2.0 Literature review; chapter 3.0 Conceptualisation; chapter 4.0 Research methodology; chapter 5.0 Reflective and reflexive practice; chapter 6.0 Collecting and analysing the data; chapter 7.0
2.0 Literature review

2.1 Preamble

As a registered architect and spatial design academic I possessed at the beginning of this study a certain understanding of how paper-based freehand sketches may be used for ideational purposes. However, it was clear that this needed to be enhanced considerably in order to contextualise the study by:

a.) identifying whether the research questions listed in chapter 1.0 Introduction had already been answered by others
b.) ascertaining if any research into the use of paper-based freehand sketches for ideation purposes could inform the study

The Literature review was conducted to provide this context and to ascertain the importance of my research into the field.

2.2 Overview of sketching

A typical spatial design project requires the meeting of a wide range of complex and contradictory wants and needs (Broadbent, 1990). These may be practical, aesthetic, contextual, technical, structural, environmental, economic and legislative, and responding to them all requires detailed, careful work plus compromise and imagination because the most effective solution overall is rarely the first one conceived nor the most obvious. Designing is furthermore ‘…an ill-structured problem solving process…’ (Bilda and Demirkan, 2003, p. 29) in which the challenges may be understood as wicked problems (Rittel and Webber, 1973) inasmuch as they are frequently unique and difficult-to-define, their solutions cannot be
classified as either true or false, and the solution to one challenge is often the cause of another.

As outlined in chapter 1.0 Introduction a typical spatial design project follows a series of broad, often overlapping stages. Although practitioners may produce drawings at various points during such a project, this study was prompted by my interest in the paper-based freehand sketches produced during ideation. These generally involve a comparatively narrow range of media (graphite pencils, fibre-tipped pens and/or ballpoint pens) used on a comparatively narrow range of surfaces (cartridge paper or similar which is plain, lined or gridded, and/or certain types of tracing paper) (Plunkett, 2009). They tend to follow certain conventions – chiefly orthographic projections (plan, section and elevation), paraline projections (axonometric, isometric and plan) and/or perspective views (one-, two- or three-point) (ibid.) – but it these may not always be followed scrupulously: for example, orthographic or paraline projections produced for ideational purposes will not necessarily be to an accurate scale and different types of sketch will often be used in hybrid combinations as the practitioner chooses what are deemed to be the most suitable representations in order to tackle the given design challenge (ibid.). Digital media is widely available for those who wish to use it (Evans and Aldoy, 2016; Salman, 2011; Dulaney Jr. and Lyn, 2010; Lim et al, 2004); it can arguably fulfil many of the functions of paper-based freehand sketching and, through the ‘Undo’ command, one additional function (Evans and Aldoy, 2016); and there are arguments that the continued involvement of paper-based freehand sketching in design ideation may be more prevalent in academic institutions than in practice (Aldoy and Evans, 2011). However, there is still a case for designers to produce a large quantity of paper-based freehand sketches during ideation in order to visualise, explore, contextualise, evaluate and develop ideas (Hannibal and Stewart, 2013; Hastings, 2013; Salman, 2011; Dulaney Jr. and Lyn, 2010; Prats et al, 2009); Wylant, 2008; Lawson, 2005; Lim et al, 2004; Bilda and Demirkan, 2003; Tversky, 2002; Kavakli and Gero, 2001; Do and Gross; 1997a; Do and Gross, 1997b; Do and Gross, 1996; Robbins and Cullinan, 1994). Indeed, freehand sketching is seen as a fundamental skill for spatial designers (Dawkins and Pable, 2013), a key part of design (Bilda and Demirkan, 2003) and essential during concept development (Bilda et al, 2006). Most practitioners and educators
regard it as intimately connected to design ability and a crucial component of year one of an architectural degree (Dulaney Jr. and Lyn, 2010). As Wylant states: ‘[t]he sketch is exploratory, effectively a mini-hypothesis in a what-if scenario used to establish relevance.’ (Wylant, 2008, p. 13) This makes it a powerful ideational tool.

This study focuses not on the technical skills required to produce paper-based freehand sketches but, as is explained in chapter 1.0 Introduction, on why they were produced and how frequently they and other ideational moves were used by the spatial design respondents sampled, what patterns of ideational moves and degrees of connectedness between them were manifest in each interview with the spatial design respondents sampled, and what appeared to be the reasons for these. Chapter 2.0 Literature review seeks to provide a broad context to the study so it begins with a brief evaluation of what I regard as the more prosaic operational benefits of using paper-based freehand sketches for ideational purposes, before focusing on a range of cognitive aspects – sketching as: language; visualisation, conversation and external memory; visual thinking; and a source of more or less unexpected ideas. There is also a consideration of expertise and mental imaging in design ideation, and of the apparent decline of paper-based freehand sketching within spatial design higher education.

2.3 Research into sketching

2.3.1 Basic operational benefits of sketching

Paper-based freehand sketches offer the spatial designer a range of important but, within the context of this study, somewhat prosaic operational benefits. They can be quick to produce (Evans and Aldoy, 2016; Dawkins and Pable, 2013; Hastings, 2013; Stones and Cassidy, 2010; Prats et al, 2009; Lim et al, 2004; Goldschmidt, 1991) and flexible (Dawkins and Pable, 2013; Hannibal and Stewart, 2013; Schenk, 2005a; Garner, 1999; Wylant, 2008); they allow the concurrent consideration of more than one design possibility (Schenk, 2005a); and they foster creative spontaneity (Evans and Aldoy, 2016). Sketches already produced can be developed by being added to, altered or having parts omitted, or being layered one on top of another to allow the practitioner to view previous images synoptically, select from them as
appropriate, and add new possibilities (Goldschmidt, 1994). They are also ‘[d]isposable – low risk/low stakes in the ideation process, easy to discard…[and f]riendly – looseness and incomplete detail invites collaboration/conversation.’ (Hastings, 2013, p. 60)

2.3.2 Sketching and cognitive activity

2.3.2.1 Sketching as visual thinking

Pei (2009) describes thinking as the mental process of arranging, comparing and bringing together sensory data. A particular kind is termed visual thinking because it utilises visual data. Designers should be able to visualise mentally things that can be seen and also things that do not exist except in the imagination, but there is another form of visualisation which involves physical representation by means of sketches, drawings and models (ibid.). Spatial design ideation involves somewhat complicated ‘imagistic reasoning’ (Goldschmidt, 1991, p. 129) and that can limit the effectiveness of non-visual or, indeed, digital approaches to ideation (see further discussion on this in section 2.3.2.5 Sketching expertise and mental imaging). Paper-based freehand sketches are thus the chief means by which designers think (Evans and Aldoy, 2016; Do and Gross, 1997a), and such sketches are also termed ‘visual thinking’ (Goldschmidt, 1994, p. 160) and ‘visual, pictorial or quasipictorial reasoning (mediated by the ‘mind’s eye’’) (Goldschmidt, 1994, p. 159). Indeed: ‘The old Italian name pensieri that was given to sketches when sketching first became common practice in the art and design world of the Renaissance, means ‘thoughts’…’ (Goldschmidt, 1991, p. 130) This type of thinking can take the form of a conversation during which the designer follows a sequence of:

‘…see-move-see…Seeing concerns a process of reinterpretation of design elements in a sketch and moving concerns transformations of the reinterpreted design elements. This [is a] two-way conversation between designer and representation…’ (Prats et al, 2009, pp. 503-4)

7 Although Goldschmidt (1994) and (1991) are rather old papers they are cited in much more recent work: for Goldschmidt (1994) see, inter alia, Christenson and Schunn (2007), Tversky (2005), Jonson (2005), Billia and Demirkan (2003), Stacey and Eckert (2003), Tovey et al (2003) and Bucciarelli (2002); and, for Goldschmidt (1991) see, inter alia, Goldschmidt and Smolkov (2008) and Tversky (2002). Thus, I argue they are relevant to this study because they inform comparatively recent research into paper-based freehand sketching used during design ideation and argue strongly that paper-based freehand sketching is important during design ideation.
I suspect that this see-move-see sequence is what Stones and Cassidy (2010) mean when they state that a sketch may stimulate a mental image which may prompt a further mental image. However, it has also been stated that the three visualising processes of seeing, imagining and sketching are interactive in that something that is seen may stimulate the imagination, which may lead to the production of one or more sketches, which, once seen, may further stimulate the imagination, and so on (Dorta, 2005). Thus, the process of ideational paper-based freehand sketching may more accurately be described as a repeating cycle of see-imagine-sketch.

If paper-based freehand ideational sketching is a type of visual thinking, is the thinking of a high-level? This is debatable. Goldschmidt distinguishes between “analytic-rational” and ‘synthetic-nonrational’ thinking (Goldschmidt, 1994, p. 161), and suggests the former relates to, inter alia, science, whilst the latter, being instinctive, visual/auditory, haphazard and subconscious, relates to the arts. She questions whether this dichotomy is accurate, arguing that ‘synthetic-nonrational’ thinking is not cognitively less advanced than ‘analytic-rational’, and asserting that it is fairly widespread in all forms of speculation intended to lead to innovative outcomes (Goldschmidt, 1994).

2.3.2.2 Sketching as language

Some supporters of visual, pictorial or quasipictorial reasoning argue that it encourages innovation because, unlike language, it has no conventions (Goldschmidt, 1994). However, research into lay people’s paper-based freehand-sketching of diagrammatic route maps indicates that these may contain some of the characteristics of language: lines representing routes, ways of separating spaces, and so on (Tversky et al, 2000). Tversky (2002) suggests the developmental sketches produced by architects can be deconstructed into a lexicon of components with certain visuo-spatial meanings. These can be assembled into more complex drawings rather as individual words can be assembled into sentences, but they also communicate visuo-spatial information directly, unlike language.
2.3.2.3 Sketching as visualisation, conversation and external memory

Paper-based freehand sketchers may make different kinds of mark with different tools and for different reasons (Lim et al, 2004). However, it appears generally to be the case that such sketches can help designers to visualise ideas by representing a range of things including ‘...shape type, surface, scale, location, spatial relationship, diagrammatic idea...’ (Lim et al, 2004, p. 394); indicating more abstract and/or conceptual matters figuratively (Tversky, 2002); and showing these in an easily viewed and manipulated manner (ibid.). As such, they enable designers to communicate with other people (Hastings, 2013; Pei, 2009; Bilda and Demirkan, 2003), but also with themselves by externalising internal thoughts and ideas (Hannibal and Stewart, 2013; Pei, 2009; Schenk, 2005; Tversky, 2002; Suwa et al, 1998; Schön, 1995; Goldschmidt, 1994; Laseau, 2001). This may be helpful because people are generally able to recall relatively limited information at any one moment (Kavakli and Gero, 2001) and paper-based freehand sketches can form an ‘external memory’ (Suwa et al, 1998, p. 476) within which visual depictions of design ideas can be deposited for later inspection and processing (Tversky, 2002), which can be useful when the design development process is not direct or orderly.

2.3.2.4 Sketching as a source of unexpected ideas

Paper-based freehand sketches can offer yet further benefits. Whilst many may simply externalise what the designer is already visualising mentally, some may be created in order to stimulate ideas that beforehand lacked any visuo-spatial characteristics (Goldschmidt, 1994). This can occur because sketches are capable of producing unanticipated as well as anticipated results when practitioners notice unexpected design possibilities in the marks they made (Hannibal and Stewart, 2013; Tversky, 2002). To aid this process, most spatial designers ‘...draw and re-draw lines, shapes, objects, and ‘fuzzy stuff’, until they can ‘read’ in, or off what has been drawn, something useful.’ (Goldschmidt, 1991, p. 131) Whilst support for the ambiguous, fuzzy nature of paper-based freehand sketches is not unanimous (Stacey and Eckert argue that the belief in these benefits are the result of ‘conceptual confusion’ (Stacey
and Eckert, 2003, p. 153) it appears to be considerable. Indeed, the etymology of the word 'sketch' ‘...may be traced through the Italian schizzo, ‘to splash,' and the Latin schedium, ‘an extemporaneous poem.’...[which] suggests that the sketch is ambiguous...’ (Dulaney Jr. and Lyn, 2010, p. 286) It is this ambiguity that provides the designer with scope for imaginative interpretation (Stones and Cassidy, 2010; Bilda and Demirkan, 2003; Kavakli and Gero, 2001). It can support at least two ideational activities (Suwa et al, 1998): firstly, ‘reinterpretation’ (Suwa et al, 1998, p. 456), by which a designer views the sketches produced previously and interprets them unexpectedly in different ways (thus, a line sketched to represent, say, a wall could later be reinterpreted as a change of floor level or finish, an axis of composition, or an item of furniture); secondly, ‘unexpected discovery’ (ibid.), by which unforeseen possibilities are discovered in partially understood design ideas – happy accidents – once they are externalised through sketching (thus, by sketching, say, a sequence of internal spaces linked by a circulation route, a compositional possibility could be discovered that was until then hidden from view).

Regarding the discovery of unanticipated possibilities, Goldschmidt, citing Wittgenstein (1973), distinguishes between seeing and imaging. The former concerns receiving (observing and describing) and latter doing (the creation of visual material that is independent of what is visible in the real world) (Goldschmidt, 1994). Imaging is of value when done effectively because it offers ‘clues’ (Goldschmidt, 1994, p. 163) that can be identified, interpreted, rearranged and reviewed – for example, as mentioned above, reinterpreting a line initially representing a wall as something else. Such paper-based freehand sketching is described, again with reference to Wittgenstein (1973), as having two modalities: ‘...seeing that...’[when the spatial designer] advances non-figural arguments pertaining to the entity that is being designed...’ (for instance, seeing that the plan of an internal space is deep and causes the space to have poor daylight), and ‘...seeing as...’ when [when the spatial designer] is using figural, or [G]estalt argumentation while ‘sketch-thinking’...’ (Goldschmidt, 1991, p. 131) (for instance, seeing a series of marks in the sketch as perhaps signifying a roof light over the poorly lit space, and realising that that could be a solution to the poor lighting). Both modalities are of value and designers need to ‘ping-pong’ (Goldschmidt, 1991, p. 139) between them, exploring what looks
possible against what appears achievable. This is termed the ‘dialectics of sketching’ (Goldschmidt, 1991, p. 138), which involves the:

‘…continuous production of displays pregnant with clues, for the purpose of visually reasoning not about something previously perceived…’ (Goldschmidt, 1991, p. 140)

Paper-based freehand sketching as outlined above enhances the designer’s ‘search-space’ (Goldschmidt, 1991, p. 130) and increases the chances of discovering the most appropriate idea (Stones and Cassidy, 2010). It could be argued that digital sketching does this too, but, because the marks made tend to be more definite and prescriptive its capacity to do so is reduced (ibid.). Generating clues by means of paper-based freehand sketching resembles de Bono’s conscious use of random images to stimulate ideas (Goldschmidt, 1991), but with the former the images are not random and the enquiry continues once the initial idea is generated (Goldschmidt, 1991; Stones and Cassidy, 2010).

It might be thought that the discoveries designers make in the ‘fuzzy stuff’ will be completely random. However, this need not be the case. Sometimes they are hidden from view but known intuitively (Bilda and Demirkan, 2003) or instinctively (termed ‘covert desire[s]’ (Goldschmidt, 1994, p. 169). These references to instinct and intuition are significant: the ‘fuzzy stuff’ might not reveal something completely unexpected but connect at a sub-conscious level to a deeper design impulse (Goldschmidt, 1994). This may be what one research respondent means when stating that paper-based freehand sketches allow the designer to ‘…look at…what’s at the back of your mind…’ (Schenk, 2005b, p. 193).

2.3.2.5 Sketching expertise and mental imaging

Suwa and Tversky’s (1996) comparative investigation into whether the ideational activity of the expert is more productive than that of the novice provides further insights into the cognitive aspects of paper-based freehand sketching. Using retrospective protocol analysis, it required experienced and inexperienced practitioners to complete a design session and give an account of their protocols. These accounts it considers against four broad types of cognitive
action (physical, perceptual, functional, and conceptual) each of which incorporates subordinate actions (ibid.). The study concludes that the evidence indicates that the expert is more productive, but advises caution because a respondent may be adept at producing design ideas but not at explaining them (ibid.).

Kavakli and Gero (2003) and Kavakli et al (1999) also discuss the approaches of an expert and a novice spatial designer, in this case concerning a conceptual design challenge. Kavakli et al (1999) reveal that, overall, the expert’s cognitive activity and image production were triple those of the novice’s. Kavakli and Gero (2003) state that an investigation into certain co-occurring cognitive actions indicates that those of an expert designer would be methodical and planned with clarity whilst a novice’s would be separated into numerous sets of parallel acts. In contrast to Suwa and Tversky (1996) their underpinning research concerns mental imagery processing which they define as comprising ‘…image generation (drawing production), inspection (attention), transformation (reinterpretation), and information retrieval from a case base in long term memory.’ (Kavakli and Gero, 2003, p. 46) They conclude that the expert’s design protocol was almost three times as rich that of the novice (Kavakli and Gero, 2003).

Much of the research into the approaches of expert and novice spatial designers summarised above states that paper-based freehand sketching is a helpful and important tool for ideation. However, there are counter-arguments. Kavakli and Gero’s (2001) paper, like those of Kavakli and Gero (2003) and Kavakli et al (1999), questions the need to produce paper-based freehand sketches at all during ideation. These papers cite a number of studies which indicate that drawing/sketching possible design arrangements appears to offer no specific benefits when compared to simply imagining them (ibid.). Based on their research they propose that, ‘…mental synthesis is at least as effective as physical synthesis.’ (Kavakli and Gero, 2001, p. 347) Bilda and Gero (2004) also address this matter. Their research found that expert architects, whilst working blindfold, could sustain, examine and develop their internal representations over a comparatively lengthy design session. Bilda et al (2006) state:

‘…experts with skilled imagery performance can maintain and transform associative
connections between the elements in their imagery effectively over an extended time period.’ (Bilda et al, 2006, p. 601)

They add that the architect Frank Lloyd Wright is described as using imagined, internal images to design buildings, resorting to drawings only in the final stages, and that their research indicates that the variations between paper-based freehand sketching and blindfolded designing are insignificant in terms of ‘...design outcome scores, total number of cognitive actions (except for recall activity) and overall density of idea production.’ (Bilda et al, 2006, p. 597) Goldschmidt (2003) goes somewhat further, stating that certain researchers have described mental imaging as being so effective as to make paper-based freehand sketching in design unnecessary. That said, the primacy of mental imaging has been questioned. In Bilda et al’s paper discussed above, the blindfolded participants argue in support of paper-based freehand sketching (Bilda et al, 2006). Investigations into the ability to remember visuo-spatial information have indicated that this is restricted if visual and spatial tasks are done only using mental imagery, '[t]hus sketching makes design thinking easier by 'seeing it' and 'storing it'.' (Bilda et al, 2006, pp. 599) In addition, it is speculated that practitioners choose paper-based freehand sketching even though they are capable of using mental imagery because it is easier and because mental imaging may become overwhelming and obstruct further design developments. Furthermore, although Goldschmidt mentions the redundancy of paper-based freehand sketching in designing she also states that this is not the case with complicated challenges (Goldschmidt, 2003). Finally, I would argue that an expert chess player/architect – particularly Frank Lloyd Wright – may have mental capacities that a novice does not. Indeed,

‘...sketching may not be a necessary act for expert designers during conceptual designing; however we do not disregard...[its] importance...in learning how to design.’ (Bilda et al, 2006, p. 600).

If spatial design students are indeed becoming increasingly reluctant to produce paper-based freehand ideational sketches, it is perhaps unlikely that this is because their mental imaging ability provides a viable alternative. However, Tversky (2002) mentions that trainee designers,
because of their lack of knowhow, might find such sketches less useful than experienced practitioners do, and Goldschmidt (1991) conjectures that novices might not know how to use them as effectively as experts do. These observations are supported by Dawkins and Pable’s (2013) application of expertise theory to the production of ideational sketches. Their study examines the approaches of students and experienced architects, seeks to understand why the latter can sketch quickly and with precision and fluency whilst the former frequently find it difficult to do so, and concludes that most students, while they may use paper-based freehand sketches to show their design ideas, lack the skill to do so satisfactorily and, as a consequence, they can become anxious about their sketching ability and form the view that it cannot improve (ibid.). As it focuses on the development of one- and two-point perspective drawing skills, the use of grids as an aid to producing perspective views, and drawing as visualisation rather than thinking, the scope of Dawkins and Pable’s (2013) research is more limited than that of mine. However, they make an interesting point. They consider students’ sketching ability against the following classification of expertise: Stage 1: the Novice; Stage 2: the Advanced Beginner; Stage 3: Competence; Stage 4: Proficiency; and Stage 5: Expertise (ibid.). Regarding the Proficiency stage, they note that students demonstrate a very strong desire to represent their ideas visually rather than using words (ibid.) but they recommend a ‘drill-style approach’ (Dawkins and Pable, 2013, p. 9) to sketching skills development for the Advanced Beginner, and argue that the student only feels able to work independently and practise willingly having reached the Competence stage. They add that, at the Proficiency stage, the student is the able to sketch without thinking, whilst, ‘[f]or the expert, thinking and acting are literally happening at the same time.’ (Dawkins and Pable, 2013, p. 15). These points suggest that most (if not all) undergraduate students will be unable to use paper-based freehand sketching fluently to produce design ideas: they will have to practise for years, moving from novice to expert, before they can do that.

2.3.2.6 The apparent decline of sketching within spatial design

higher education

The above review indicates that paper-based freehand sketches can offer the spatial designer
a powerful tool for visualising, exploring, evaluating and developing ideas during ideation. However, there is evidence that, in recent years, the production of such sketches by undergraduates has been decreasing. For example, Schenk discusses the apparent decline amongst graphic design students in higher education (Schenk, 2005b; Schenk, 2005a), as do Netter and Tibus (2013). Although these papers do not mention spatial design per se, they offer several helpful insights of a broader nature. Schenk (2005b) mentions that design industry spokespersons have expressed concern about the falloff in paper-based freehand sketching and that employers still stress the connection between ideational ability and the ability to produce such sketches, and Schenk (2005a) mentions the warnings of experienced design tutors that the creativity of students who cannot draw will be limited. Considering the professional context Welton (2011) states that hardly any recently qualified architects appear able to produce paper-based freehand sketches and quotes several academics and practitioners who share his unease, whilst Mitchell (2011) reveals that Prince Charles said in 2008: ‘...I don’t trust any architect who can’t draw.’ (Mitchell, 2011, p. 1)

Schenk (2005b) offers possible reasons for the decline, stating that hand-drawing tuition has in recent years become integrated with project tuition; there is an increased likelihood that design tutors rather than drawing specialists will teach it (although whether this is causing the decline is yet to be determined); applicants to undergraduate design courses who cannot draw well by hand and a few years ago might have been rejected are now able to secure places but must find other ways of developing and communicating their ideas; a significant number of academics with a prolonged experience of working digitally ranked drawing ability in student applicants either “useful” or “irrelevant” (Schenk, 2005b, p. 193); and younger practitioners argue that paper-based freehand sketches are no longer a necessary precursor to imaginative, rigorous design work. Hastings (2013) makes a similar point regarding graphic design education in the USA, stating that many undergraduates do not think it is necessary to be able to draw and regard the computer as the only drawing implement necessary: ‘[l]earning to draw seems a step backward…or even archaic.’ (Hastings, 2013, p. 61) Eckert et al (2004) and Jonson (2004) also mention a tendency for students to use computers in preference to paper-based freehand sketching. Hannibal and Stewart (2013) decry this, stating that growing
dependence on digital drawing packages is devaluing paper-based freehand sketching and circumventing the ideational processes that can stimulate innovative results. They add:

‘This…meant that first year students effectively demoted design practice…to one of fixing ideas at the early stages, thus…shifting their focus…to product[ion].’ (Hannibal and Stewart, 2013, p. 54)

Furthermore, Hastings (2013) states that numerous universities no longer include drawing tuition for design students, Mitchell (2011) argues that it is under-resourced, and both Mitchell (2011) and Garner (1999) state (perhaps regarding industrial design in the case of Garner) that it has been squeezed out of the syllabus.

The above comments, observations and insights suggest that paper-based freehand sketching may be going through a sea-change that is putting it under threat from within universities and also without. That said, Aldoy and Evans’ (2011) research into the opinions of industrial and product design practitioners and recent graduates on paper-based and digital ideational sketching reveals that ‘…91 per cent of graduating students [from the sample] often/always used paper-based sketching as opposed to its digital equivalent…’ (Aldoy and Evans, 2011, p. 360); and, in the opinion of both groups of participants, digital sketching could not displace paper-based freehand sketching (although practitioners appear to have been more willing to accept that this might happen one day) (Aldoy and Evans, 2011).

2.4 Overlapping research

I believe this study is of value because, although a number of researchers have investigated paper-based freehand sketching and design ideation, their work does not answer thoroughly my research questions. Evans and Aldoy’s (2016) study comparing the use during design ideation of paper-based freehand sketching and two-dimensional digital sketching on a portable tablet personal computer overlaps with my study. In their literature review they note the need for paper-based freehand sketching to afford swiftness, spontaneity and ambiguity, and they discuss it as a form of thinking (ibid.), characteristics which I mention as being
important above. They distinguish between sketches and drawings, describing the former as ‘…spontaneous freehand visualisations of initial ideas whilst…the latter involve greater control in the representations of objects that already exist…’ (Evans and Aldoy, 2016, p. 3), which accords with the position I have taken during this study. Their data sample includes undergraduate participants, as does mine. That said, Evans and Aldoy’s (2016) study is also distinct from mine because their undergraduate participants were product designers, not spatial designers (and it cannot be guaranteed that students from both courses will make the same ideational moves using the same ideational toolkit); those participants carried out design activities specified by the researchers; and the study did not focus on the production of sketchbook material per se, nor on the ideational moves the participants chose to make (ibid.).

Monteiro de Menezes’ doctoral research concerns ‘…role of sketching in conceptual design…and the mental process involved in the analysis and verbal description of conceptual sketches.’ (Monteiro de Menezes, 2004, p. iii) His study explores how experienced and inexperienced designers saw different possibilities within the same concept sketches (both architectural and non-architectural) and described them differently, and what this may indicate about how these people approached ideation. It investigates how the visual language of lines, circles, rectangles and so on enables a practitioner to ‘…think with sketches…’ (ibid.) and concludes that the experienced designer made greater use of ‘…formal and symbolic verbal references…than novices while describing the same images…’ (ibid.) De Menezes’ research overlaps the aims of my study in several ways, including the following:

‘…[his] analysis method used retrospective reports and focused on the abilities to think and describe drawings…’ (Monteiro de Menezes, 2004, p. 260)

‘…[he alone] analysed the protocols…’ (ibid.)

Furthermore, his work has informed mine in several ways: for example, his review of the different types of architectural drawing, his account of the process of conceptual sketching, and his exposition of the different definitions and understandings of ‘visual thinking’ (Monteiro
de Menezes, 2004, p. 65). However, his focus on cognitive psychology and requirement that the research participants discussed paper-based freehand sketches that he had provided make Monteiro de Menezes' work distinct from mine, as do his investigation of the participants' description times and remembering times, quantitative analysis of cognitive actions, and quest for statistical significance (during the main study I considered investigating my respondents' cognitive actions but subsequently formed the view that the data were not suitable for this). Also his focus (on ‘…differences between the novice and expert designers…’ (Monteiro de Menezes, 2004, p. 74)) is different from mine although he does speculate on this regarding the work of Dawkins and Pable (2013) which I discuss below. It is my contention that my and Montero de Menezes work contribute to the understanding of ‘…the designer's interaction with sketches…’ (Monteiro de Menezes, 2004, p. 266), but that they do so in different ways.

Garner's doctoral research explores how designing and ‘…freehand drawing or sketching…’ (Garner, 1999, p. ix) interact. Like Monteiro de Menezes’ study, it concerns the cognitive aspects of ideation and paper-based sketching, however, it focuses on industrial design in particular, examines ideation work carried out by teams, and addresses the impact – arguably negative – of developments in computing on design team efficacy. It overlaps with my research chiefly in that it investigates ‘…freehand drawing or sketching…’ (Garner, 1999, p. 194) implemented during design ideation, considers the carrying out of such work in an educational context, and includes an account – albeit comparatively brief – of the uses of focused interviews to obtain data. Notwithstanding this, Garner’s use of quantitative data analysis methods (comparing the mean number of overall drawing production and graphic acts evidenced by pairs of designers working proximally with those evidenced by designers working remotely using digital means to communicate with each other) distinguishes his work from mine, as does his interest in what he terms ‘…computer supported design team working…’ (Garner, 1999, p. 5)

Jonson's doctoral research asks, ‘…what is the impact of digital technology on conceptual tools, notably the traditional pen and paper sketch?’ (Jonson, 2004, p. 2) In common with Monteiro de Menezes’ (2004) study, it explores ideation by experienced and inexperienced
designers; in common with Monteiro de Menezes’ (ibid.) and Garner’s (1999) it investigates conceptual thinking; and in common with Garner’s (ibid.) it examines ‘…sketching together with verbalisation…’ (Jonson, 2004, p. 2 – my italics) during conceptualisation. Jonson describes his study as probing:

‘…how designers go about capturing, articulating and recording their ideas…In so doing…what conceptual tools do they use, and why?’ (Jonson, 2004, p. 123)

In this it overlaps considerably with my research. Indeed, I gained numerous insights from Jonson’s literature review, interviews with educators and practitioners from a range of design disciplines, and data from studies into the use of sketching by first- and second-year design students and recent architecture graduates. His thesis provides helpful guidance on which methodologies might be adopted and adapted to gain insights into the use of paper-based freehand sketches for design development purposes during ideation (see chapter 4.0 Research methodology), including the use of recorded and transcribed interviews as data sources. That said, Jonson’s study contrasts with mine in that his research spans the fields of product design, fashion design, graphic design, ‘General design’ (Jonson, 2004, p. 138) and architecture, and includes ‘…observation of the…uses of conceptual tools…’ (Jonson, 2004, p. 142, citing Yin, 2003); and his research questions are focused, inter alia, on comparisons across design fields and between academia and industry (Jonson, 2004). My study, meanwhile, is not concerned with different design domains nor industrial practitioners, and excludes observational research. Finally, whilst I have sought to identify a range of ideational moves used in the respondents’ sketchbook material (including, as discussed in section 8.2.1 Ideational moves, paper-based freehand sketch diagrams, paper-based freehand sketch perspectives, non-visuo-spatial research, a word-based approach, collage, photographs, CAD software and physical models) Jonson uses a somewhat simpler series of codes to analyse his research participants’ design conceptualisation tools:

‘…any freehand drawing including doodling were considered to be sketching [S]. Words [W] meant both spoken and written words...[including] Library and Internet
Any activity involving direct manipulation of materials, say card, metal, cloth or plasticine, was categorised as modelling \([M]\). Any digital work, including scanned and digitally manipulated freehand sketches or ready-made images, was classified as computing \([C]\).’ (Jonson, 2004, p. 169)

I stated in 2.1 **Preamble** that I sought to contextualise this study by:

a.) identifying whether the research questions listed in chapter 1.0 **Introduction** had already been answered by others, and (if they had not)

b.) ascertaining if any research into the use of paper-based freehand sketches for ideation purposes could inform my study

The Literature review has provided a broad background to my study by revealing: the key benefits of using paper-based freehand sketching during design ideation; the impact of digital technologies on the use of paper-based freehand sketching during design ideation; and, speculations about mental imaging as a viable replacement to the use of paper-based freehand sketching during design ideation. It has also provided insights into the apparent decline of paper-based freehand sketching within spatial design higher education. However, it has provided no evidence that my research questions have been answered by others.

### 3.0 Conceptualisation

#### 3.1 Preamble

As was stated in chapter 1.0 **Introduction**, this study went through significant changes over time. Although certain essentials persisted (ie: the focus on undergraduate spatial design students’ approaches to ideation; primary data collection methods; and qualitative, relativist, constructivist, reflexive approach), the hypothesis, aim and objectives were replaced by research questions; the focus on paper-based freehand sketches used during spatial design ideation widened to encompass the range of ideational moves evidenced in the sketchbook material; the methods used for data analysis changed from content analysis to ‘evolved’
grounded theory and then constructivist grounded theory, and elements of ANT were utilised as the conceptual framework. The phases the study went through, and the tasks carried out in each, are summarised in the diagram in **figure 1** below.
Figure 1 – Summary of research methodology
I now understand that the changes summarised above were translations as defined within the field of ANT (Law, 2007; Latour, 1999; Callon, 1986) and that they are therefore part of the data to be analysed. At the outset, however, the methodology did not include the use of ANT as a means of conceptualising the study. That said, I cannot discuss this methodology without describing these translations as translations, so this part of the thesis begins with an account of the role of ANT in the conceptualisation the research and follows that with an account of the methods of data collection and analysis used during the pilot and main studies.

3.2 Actor-network theory – an overview

As is discussed more fully in section 6.6 Arranging the interviews, each interview contained dissimilarities: the thirteen respondents were different people studying at three distinct institutions; their sketchbook material concerned a range of projects and was arranged, displayed and discussed in a variety of ways; and the interviews took place in several settings. Furthermore, as mentioned in chapter 1.0 Introduction, by participating in the interviews I was part of the data, and by interpreting those data I was part of the emerging theory (Cole et al, 2011), but I cannot guarantee to have remained the same person throughout. As Cole et al state, '[a] case for a positivistic approach to this kind of intervention could...be made, but the possibility of collecting neutral and objective data in this tradition is a non starter as the research material would be coloured and subjective...' (Cole et al, 2011, p. 142) How can such a varied, complex, subjective and apparently fragile network produce research outcomes that are robust? ANT offers a way forward. ANT regards the social and natural worlds as being formed of a range of actors: ‘...objects, subjects, human beings, machines, animals, ‘nature’, ideas, organisations, inequalities, scale and sizes, and geographical arrangements.’ (Law, 2007, p. 2) It makes little distinction between human and non-human actors: ‘...people are relational effects that include both the human and the non-human...while object-webs conversely include people...’ (Law, 2007, p. 8), '[h]uman and non-human...big and small, macro and micro, social and technical, nature and culture...are just some of the dualisms undone by...[ANT]...’ (ibid.) and '[t]he observer must abandon all a priori distinctions between natural and social events...’ (Callon, 1986, p. 199) This lack of distinction between the human and non-human is termed ‘agnosticism’ (Callon, 1986, p. 196).
ANT treats contradictory points of view in a similarly even-handed way: ‘[n]o point of view is
privileged and no interpretation is censored.’ (Callon, 1986, p. 199) This is termed the
‘principle of symmetry’ (Law, 2007, p. 4). Generalised symmetry stresses the need to use the
same vocabulary of terms concerning all the actors in a network whether human or non-
human (Callon, 1986). Concern with symmetry is matched by concern with asymmetry, which
can result from examining certain aspects of what the actors say (and, presumably, do) with a
high level of acceptance but not others (Callon, 1986). This matter is discussed in chapter 8.0
Analysis and findings, but it should be noted here that I spotted myself working
asymmetrically early on in the study. Examples of this include treating the interview transcript
as a more important source of data than the video-recording, and focusing on the transcribed
spoken word and the video-recorded sketchbook material as data sources whilst ignoring
body language and gesture. Also, as will be seen in chapter 8.0 Analysis and findings,
during her interview respondent 11 repeatedly mentioned work that was missing and placed
paper coasters on her sketchbook material to mark where it needed to be added, but I initially
regarded these statements and actions as unimportant because, as the work was missing, it
could not be analysed. Adopting a more symmetrical approach later on led to the
understanding that there may be considerable value in these data.

In ANT, networks are described as loose, delicate and impermanent, and causing the actors
temporarily to change as they respond to, interact with and impact on each other (Law, 2007).
Thus, an account of a scallop fishing research project at St Brieuc Bay includes discussion of
the ‘…construction of a network of relationships in which social and natural entities mutually
control who they are and what they want.’ (Callon, 1986, p. 201) Networks may have different
architectures developed consciously or unconsciously (Law, 2007), and may also be mostly
unseen: ‘[a]n actor is always a network of elements that it does not fully recognise or know…’
(Law, 2007, p. 8) I understand that my study has comprised a number of interconnected
networks formed of combinations of the actors listed by Law (2007) above, and which are
loose, delicate, impermanent, largely unseen, and, on occasions, unconsciously developed.
In my judgment, one of these networks included, inter alia, the following actors:
• myself as researcher (human being) with my agenda for enquiry (subject and ideas); preconceptions about the institutions and respondents (ideas and inequalities); insecurities about the interview process (ideas and inequalities) and equipment (ideas); and concerns about the interview duration, number of main study interviews per visit, and subsequent transcript challenges (scale and sizes)

• the gatekeepers (human beings) with their agendas for the institution (ideas and inequalities)

• the venues (organisations, inequalities, scale and sizes, and geographical arrangements)

• the interview spaces (geographical arrangements, objects and machines (regarding the furniture) and ‘nature’ (regarding the background noise))

• my interview equipment – the cam-corder, tripod, MacBook, power leads, hard-copy schedule of questions, briefing notes and consent form (objects and machines)

• the respondents (human beings), some from my own institution, some from others, all with their own preconceptions and responses (ideas and inequalities)

• the spoken content of the interviews (ideas, subjects, inequalities and human beings)

• the sketchbook material (objects, subjects and ideas), the sizes of these items as sources of data (scale and sizes)

• the non-spoken content of the interviews – for example, body language, page-turning, unprompted pointing and so on (human beings)

• the video-recordings (objects, subjects and ideas)

• the video transcripts (objects, subjects and ideas)

I believe another network included, inter alia:

• myself as a research student (human being) with my research questions (subject and ideas); preconceptions and insecurities about the research tasks (ideas and
inequalities); desire for success and fear of failure (ideas and inequalities); and other
academic roles (organisations and inequalities)

- my Director of Studies and Second Supervisor (human beings, ideas and
inequalities)
- the Research Graduate School (organisation, human beings and inequalities)
- the video-recordings (objects, subjects and ideas)
- the video transcripts (objects, subjects and ideas)
- my laptop (object and machine)
- my preferred place of work – at home in my garden (geographical arrangements and
'nature')

It may be asked whether it is legitimate to regard the respondents and their sketchbook
material agnostically as actors in a network. Respondent 05 helps answer that question.
When she revealed her sketchbook material, it seemed to me as though, rather than tabling a
sequence of inanimate visual items, she was interacting with something she found
unpredictable, perplexing, surprising, overwhelming and occasionally mysterious. Having
noted this perception, I underwent a period of reflexivity, and this contributed significantly to
the development of my conclusions. A more asymmetrical approach may have led me to
focus on respondent 05’s sketchbook material, and dismiss her interaction with it as having
no bearing on the study.

It might be asked whether it is legitimate to regard the cam-corder agnostically as an actor in
a network. The cam-corder surely impacted on the study because it provided an abundance
of audible and sharply-focused data, but, on occasions, it failed to capture the sketchbook
material clearly; it amplified background noise such that on occasions this became intrusive
when playing the video-recording; and its battery needed to be recharged, and its memory
card emptied, at inconvenient times. Surely it did these things as an object, possessing no
intent, and thus cannot be treated the same way as a human actor? More is said about that
below, but, within this overview of ANT, it may be helpful to remind ourselves that ‘…the
technology of the video-recorder ‘participates’ in the production of the record…’ (Jewett,
Thus, it would appear to be legitimate to regard the camcorder as one of several actors.

The actor-networks I have identified in my study are discussed more fully in chapter 8.0 *Analysis and findings*. However, as Law observes:

‘…since our own stories weave further webs, it is never the case that they simply describe. They too enact realities and versions of the better and the worse, the right and the wrong, the appealing and the unappealing.’ (Law, 2007, p. 16)

Thus, my thesis may be understood as an actor in another temporary and largely hidden network which also includes, *inter alia*, me as the researcher, my Director of Studies, the Examiners and the Research Graduate School.

### 3.3 Actor-network theory and disciplinary distinctions

In his account of a discussion – although not an interview – between two participants in a soil analysis project in the Amazonian Forest, Latour provides a helpful insight into how ANT views disciplinary distinctions (Latour, 1999). These actors could not agree on whether the Amazonian Forest was getting larger or smaller because each person viewed the question through the filter created by his/her own discipline. Although they were colleagues and both working on the same project, they were not homogeneous: they used different words and phrases, followed different traditions, referred to different equipment, had different intentions for their research outcomes, and understood different things by words that appeared to belong to a shared vocabulary (*ibid.*). Law also discusses different disciplines, referring to them as ‘…different enacted realities…’ (Law, 2007, p. 15) which become apparent regarding the diagnosis and treatment of a lower limb arterial pathology in that the condition manifests differently in the doctor’s surgery, radiography, ultrasound and the operating theatre: ‘…each practice generates its own material reality…’ (Law, 2007, p. 13) These points need to be borne in mind here because it is possible that the interviews I conducted for this study also involved multiple realities. In this case these would not have been different disciplines *per se*
because the participants were all spatial designers, but it may have been that these participants – as was stated above, thirteen different respondents from three distinct institutions, plus myself – were also taking different positions on design ideation, paper-based freehand sketching, digital drawing and research, and even on the meaning of these words and phrases. Furthermore, at any point during an interview the respondent may have performed as, say, an exponent of ideational sketching showing interesting material to an expert in the field, a spatial design student discussing ideational work with an experienced tutor, an ambassador for one of three institutions, or a volunteer no longer sure of why they had agreed to be interviewed. Meanwhile, I may have performed as, say, a part-time doctoral researcher seeking new knowledge, a spatial design tutor discussing ideational work with a student, an experienced interviewer operating with proficiency, or someone anxiously encouraging the volunteer to keep engaging with the interview. These changes of behaviour – actual in my case, and hypothetical in the case of the respondents – prompt the question: can such heterogeneity produce research outcomes that are robust? In devising my research methodology, I sought to minimise heterogeneity across the sample so that worthwhile comparisons of the data could be made. This is discussed in sections 6.3.1 Defining the sample and 6.3.2 Primary data sources, where it is acknowledged that, although the interview sample and venues demonstrate a degree of homogeneity, they also demonstrate greater heterogeneity. Whilst this may seem undesirable, ANT advises qualitative researchers not to assume that homogeneity is achievable. Thus, whilst my intention in this study has been to minimise heterogeneity, it has also been to be mindful that heterogeneity will persist and will need to be addressed during the analysis and conceptualisation.

3.4 ANT and power relationships

In ANT-informed research it is important to consider power relationships by ‘...describing the way in which actors are defined, associated and simultaneously obliged to remain faithful to their alliances...’ (Callon, 1986, p. 214) Who had the power within the networks that formed around my research, and who conferred it on them? This is discussed more fully in chapter 8.0 Analysis and findings, but it should be noted here that whilst it may be that my roles as
interviewer and, during the pilot study, course tutor afforded power during this study, the
gatekeepers had greater power inasmuch as, if none agreed to grant me access, this study
could have floundered. It is also arguable that all the respondents had greater power still
because they could decide not to participate in the interview, or withdraw from it at any time.
Moreover, I also perceived that the cam-corder had greater power than did myself, the
gatekeepers or the respondents inasmuch as, if it ceased to work, the interview ceased to be
a data source, and with no data there was no study.

3.5 Translation and domestication

Thus far in this thesis, I have referred several times to the ANT concept of translation. From
the current section to section 3.13 ‘Moments’ of translation – mobilisation inclusive, I will
discuss it at length. I have already mentioned that actors in a network may change
temporarily as they respond to, and interact with, each other, and that within ANT this is
known as translation (Callon, 1986). Translation may occur in a number of ways. For
example, it is described as leading to the various human and non-human actors in a network
becoming ‘domesticated’ (Law, 2007, p. 5). The St Brieuc Bay research project (Callon, 1986)
discussed in section 3.2 Actor-network theory – an overview offers an instance of this in
that the researchers, fishermen and scallops, by responding to each other and moderating
their behaviour accordingly, became domesticated. Another instance is a low-technology
water pump in rural Zimbabwe discussed by Law (2007). When this device needs to be
repaired, the villagers do so by using the available materials, skills and resources and as a
consequence each becomes different, customised and localised: domesticated. It remains
essentially a pump but it is no longer the same pump (Law, 2007). It is my contention that the
sketchbook material brought to the interviews conducted for this study underwent
domestication during the interviews when each respondent, by page-turning, pointing and
sorting sketchbook material without having been prompted, in effect customised the material.
I also contend that I participated in this process of domestication by, for example, helping to
rearrange respondent 07’s loose items on the table-top, searching through respondent 05’s
chaotic loose work and pointing at items in each respondent’s sketchbook material.
When I brought the human actors listed above together in a temporary network in order to
develop grounded theory, it is likely that those actors will through a process of domestication
have changed, and that this will have transformed the data and/or how it is perceived. This
matter is discussed in chapter 8.0 **Analysis and findings** below, but it is worth noting two
examples here. Firstly, inasmuch as an interview involves ‘interplay’ (Cole *et al*, 2011)
between the participants and is therefore both ‘contextual’ and ‘negotiated’ (Charmaz, 2006,
p. 27) it may be understood as a sequence of translations as the actors respond to the setting
and to each other. This point will be returned to later in this section. Secondly, as was noted
in section 3.2 **Actor-network theory – an overview**, during the pilot study interviews I
found the fully charged camcorder up did not contain enough electrical power to record four
interviews back-to-back. This told me it was necessary to conduct each interview in a location
with a nearby power source. It is arguable that the camcorder was domesticating my
research methodology here, imposing its own limits and, in effect, requiring that adjustments
were made.

Overall, it should be kept in mind that during the journey from data collection to the
presentation of findings, many translations may occur, and these can be challenging: ‘…one
never travels directly from objects to words, from the referent to the sign, but always through
a risky intermediary pathway.’ (Latour, 1999, p. 40) The ‘objects’ mentioned in this quotation
could be Amazonian Forest soil samples (Latour, 1999), but I believe the interviews carried
out have a similar status. The journey from those to the research outcomes has arguably also
been challenging because it too has been indirect, involving video-recordings, words
(transcripts, memos, codes and categories), diagrams, and more words (this thesis). How can
the researcher avoid getting lost along such a journey? Latour (1999) offers guidance here.
Concerning a storage/display unit that both categorises and protects the researchers’
Amazonian Forest plant samples he asks,

‘[a]re we near or far from the forest? Near, since one finds it here in the collection…[But
only] those few specimens and representatives that are of interest to the botanist…Let
us say we are in between...[A] tiny part allows the grasping of the immense whole...During the transportation something has been preserved.’ (Latour, 1999, p. 36)

I contend that the respondents’ sketchbook material shares some of these characteristics: this material was not the student’s design ideation process per se, but it documented parts of it (or appeared to) and had a durability that the process itself lacked. The sketchbook material may therefore be seen as preserving elements of the ideational process during translation. Is the material near or far from that process? Near, I argue, because in it there is (or appears to be) ideation work that is pointed out by the respondent and noticed the interviewer. But it is also far because ideation is bigger and more complex than can be documented in sketchbook material. This material forms a fragment that may enable the wider entirety to be grasped (Latour, 1999). What it preserves is the sketches, annotation, photographs and so on that evidence (or purport to evidence, or are deemed to evidence) an ideational journey; what it loses is that which is bigger and more complex.

The storage/display unit Latour discusses (ibid.) offers a number of other benefits, including enabling the samples to be viewed with ease, viewed synoptically and rearranged at will, thus enabling the researchers to make discoveries and undergo change as a consequence. That said, the samples have also undergone change, having been removed from their natural habitat (ibid.). I regard the video-recordings as having similar characteristics. They enabled me to view the data remotely from the point of collection; view it swiftly, repeatedly and selectively (Jewett, 2012; Heath et al, 2010); view it synoptically across the sample; and undergo change because I discovered things on viewing them of which I was not aware whilst conducting the interviews themselves. Also, the interviews have undergone change because they were not the video-recordings – as is discussed in section 3.14 Establishing network stability – material durability, although video-recordings capture certain things they omit others (Jewett, 2012), and they thus form fragments that may enable the wider entirety to be grasped (ibid.).
Translation may also be considered within the context of data overload, which is discussed at various points in this thesis, and particularly in section 4.6.4 **Open and focused coding – key difficulties encountered.** In the Amazonian Forest project (Latour, 1999), one of the researchers simplifies the complex and baffling forest by collecting leaf samples. These, plus the researcher’s field notes, peer responses to the work and the need to keep up-to-date with wider reading can swiftly result in complexity more or less returning (*ibid.*). I had similar experiences during this study. After completing the first interview, there was one apparently simple thing to tackle: a single video-recording. However, this moment of simplicity soon gave way to a complex array of multiple video-recordings, transcripts, codes, sub-codes and memos. As Latour puts it:

‘...the first instrument is hardly operational when we must think of a second device to absorb what its predecessor has already inscribed...Knowledge derives from such *movements*, not from simple contemplation of the...[original data].’ (Latour, 1999, p. 39)

At this point in the Amazonian Forest, something was gained and something lost (Latour, 1999). Similarly, on completion of each stage of my study – for example, writing the transcript, openly coding the video-recording and the transcript, or producing an initial diagram representing the analysis – I felt a brief sense of clarity before complexity returned, accompanied by feelings of frustration and temporary uncertainty about how to engage with the work ahead.

### 3.6 Translation and diagrams

Both the Amazonian Forest project (Latour, 1999) and my study led to the diagrammatic representation of the research findings. Latour, discussing a somewhat unrealistic sectional sketch of the forest floor, observes that, rather than attempting to look like the original soil, its function is to replace it within the project (*ibid.*). The diagram encapsulates the entire site, which the researchers no longer even consider although they are standing on it: the sign has replaced the physical thing (*ibid.*). During the latter stages of analysis and the formulation of
the conclusions, my ‘timeline’ and ‘synoptic’ diagrams (see definitions of these in chapter 7.0 Diagramming) also took the place of the original interviews. The video-recordings of those interviews provided rich data, but the process of abstraction through coding and categorising led to those data being gradually replaced by the diagrams. Through this method, ‘…we become superior to that which is greater than us, and we are able to gather together synoptically all the actions that occurred over many days and that we have since forgotten.’ (Latour, 1999, p. 65) However, Latour argues that the diagrams have more power even than this. Each of them is significant in a way that many of the preceding stages and processes were not. In the Amazonian Forest, a device called a pedocomparator was used to store and display soil samples in a grid (Latour, 1999). Because it was too unwieldy to be placed in the researcher’s written report, it had to be kept safe in case it was needed subsequently, but it played no significant role in the publications. Similarly, my videos do not form part of this thesis and neither do most of the transcripts, nor most of the table of categories and sub-categories (which, at 213 pages, is, like the pedocomparator, too unwieldy to be included in full). Arguably, these absent items have ceased to have a significant role to play in my study, although they too will be kept in reserve in case needed in future. What counts are my diagrams. These contain not the respondents’ words, nor images of their sketchbook work, nor details of each category and sub-category, but colour-coded symbols laid out in rows or spread out in networks. Once the transition from physical thing to sign has been made, the physical thing is, in effect ‘…able to travel through space without further alterations and to remain intact through time.’ (Latour, 1999, p. 51) The categorised and sub-categorised data from the video-recordings has undergone a similar translation from thing to sign. This makes my diagrams much more abstract than the preceding phases in the project, but also more solid because, in each of them, a summary of an entire interview can be held and seen (Latour, 1999).

The diagram produced for the Amazonian Forest research project offers further insights in that it reveals characteristics that were previously unseen because they were immediately below the researchers’ feet (ibid.). In my study, the situation is surprisingly similar. The data in the video-recordings was found to be so rich that it was not possible identify patterns simply
by means of the techniques used during the content analysis and ‘evolved’ grounded theory stages. It was necessary for me to create the diagrams as visual representations of the data, and to analyse those in order to see what was in effect visible all the time but unseen. Also, like the soil strata, each sketchbook page formed a layer during the video-recording, hidden from view until revealed over time by the respondent or myself. In the diagrams, all of these items are visible simultaneously.

3.7 A cascade of translations

The value of diagrams as a tool for grounded theorising will be discussed in chapter 7.0 Diagramming. It should be noted here, however, that Latour (ibid.) reveals a potential pitfall in their use: diagrams can appear highly persuasive whilst actually being poorly connected to the data and analysis that were originally presented using quite different means. How can I be sure that that has not happened in my study? I acknowledge there is a gap between the diagrams I produced and the original interviews, and an even wider one between my diagrams and the respondent’s original ideational work, so what allows me to argue that there are legitimate links between these: is there something unvarying that is preserved across a cascade of translations (ibid.)? Latour’s account of the Amazonian Forest research project (ibid.) offers two helpful insights. Firstly, he notes that the soil samples collected are colour-coded, labelled and numbered using an international system that can be swiftly understood by a wide audience. To enable categorisation, one of the analysts uses a series of swatches, each of which has a hole in it. When the swatch is placed over the sample, its colour can be compared to the soil colour seen through the hole (ibid.). This process requires that other characteristics of the soil, such as volume and texture, are ignored. The swatch becomes ‘...an intermediary between the earth, summarised as a colour, and the number inscribed under the corresponding shade.’ (Latour, 1999, p. 61) Once categorised, the soil sample can be disposed of, having been substituted by a few words that embody certain of its characteristics (Latour, 1999). Those words do not bear a physical resemblance to the soil nor are they simply a figure of speech. Rather, they compress the original sample and replace it with a sign (ibid.). Categorised in this way, the soil sample is not the numbered category: there is always a gap separating them (ibid.).
It is arguable that the above considerations could also be applied to my diagrams. In these, as is stated in chapter 7.0 **Diagramming**, a symbol replaces a categorised or sub-categorised statement, image, and/or move identified within a video-recording. This is not term-to-term correspondence nor a figure of speech, but compression of data. In a multi-stage study like the one in the Amazonian Forest, the cascade involves ‘…aligning each stage with the ones that precede and follow it...’ (Latour, 1999, p. 64) Thus, for the soil analysts, ‘…the earth becomes a cardboard cube, words become paper, colours become numbers, and so forth...’ (Latour, 1999, p. 69) In my study, a respondent’s paper-based freehand sketch, as encountered during a video-recording, becomes a sub-categorised ideational move that links to the original data and to a broader category through one or more memos; the sub-categorised ideational move becomes a symbol in a diagram that links to, a.) the sub-category, b.) the broader category, c.) the video-recording timeline (approximately), d.) other categories and sub-categories, and e.) the original statement through one or more memos concerning connectedness. Within this cascade, the memos play an important role in establishing a robust sequence of retraceable elements that map out the path from interview to diagram.

Latour’s account of the Amazonian Forest research project (Latour, 1999) offers a further helpful insight. He mentions how the final diagram produced by one of the research team reveals an uninterrupted sequence of links with preceding project steps during which samples were extracted from the soil, placed in the pedocomparator (this piece of equipment is described briefly in section 3.6 **Translation and diagrams**), classified, labelled and identified by means of horizontal and vertical grid references. At every step:

‘…each element belongs to matter by its origin and to form by its destination; it is abstracted from a too-concrete domain before it becomes, at the next stage, too concrete again. We never detect the rupture between things and signs…We only see an unbroken series of well-nested elements, each of which plays the role of sign for the previous one and of thing for the succeeding one.’ (Latour, 1999, p. 56)
I believe the means of representing data and analysis in my study offer a similarly uninterrupted sequence of well-connected steps, starting with the interviews (the equivalent of soil samples) and ending with the diagrams. How can this be demonstrated? With the Amazonian Forest project (Latour, 1999), each phase does not resemble the preceding one, so it is not possible to overlay them. Continuity is provided through other means. Photographs and written reports all concern the same changes taking place along the edge of the Amazonian Forest,

‘[b]ut these acts…rely not so much on resemblance as on a regulated series of transformations, transmutations, and translations. A thing can remain more durable and be transported farther and more quickly if it continues to undergo transformations at each stage of this long cascade.’ (Latour, 1999, pp. 57-58)

I regard the changes through which the data and analysis went, from interviews to video-recordings, transcripts, memos, tabulated codes and sub-codes, further memos, tabulated categories and sub-categories, diagrams, and, finally, this thesis, as forming a similarly measured sequence of translations. As I have noted above, the video-recordings enabled data from each interview to be viewed with comparative ease; the tabulated codes, sub-codes, categories and sub-categories enabled data from an entire interview to be viewed comparatively swiftly, permitting preliminary comparisons to be made between different respondents; and the diagrams enabled data from an entire interview to be viewed at a glance, thus permitting patterns and themes to be identified within an interview and more detailed comparisons made between different respondents. I believe these changes enabled the study to be more durable than if the analysis had remained with the original data or even the video-recordings.
3.8 Translation and the knowable world

The above discussion indicates that translation in qualitative research may be both hard to deal with and hard to avoid. However, it may also be extremely necessary. Regarding the Amazonian Forest research project:

'[f]or the world to become knowable, it must become a laboratory…[and if] virgin forest is to be transformed into a laboratory, the forest must be prepared to be rendered as a diagram.' (Latour, 1999, p. 43)

In my study, it is arguable that the original setting also went through a series of translations to make it knowable. For example, as is discussed in chapter 4.0 Research methodology, I selected certain academic institutions as the sources of primary data, designated focused interviews as the key means of procuring those data, accessed through gatekeepers certain undergraduate spatial design students who were to provide the data, and devised a toolkit of equipment and materials to enable the interviews to be carried out. All of these moves may be seen as transforming the original research setting into a form of laboratory.

3.9 The presence of multiple actor-networks

In considering translations as outlined above, the view may perhaps be formed that the result will be one reality incorporating the various actors. However, such a result is not certain. In any research setting there may be multiple actor-networks present, and this ‘…wash[es] away a single crucial assumption: that successful translation generates…a single coherent reality. Any such coherence, if it happens at all, is a momentary achievement.’ (Law, 2007, p. 13)

3.10 ‘Moments’ of translation – problematisation

At St Brieuc Bay there were several ‘moments’ of translation’ (Callon, 1986, p. 196) when the researchers sought to impact on the research setting. The first of these involves ‘problematisation’ (ibid.): the researchers attempting to make themselves essential to the other actors by indicating that they, the researchers, could solve the problems that had been
identified (Callon, 1986). Does this apply to my study? I regard it as unlikely inasmuch as, although this study began with the premise that students needed to use paper-based freehand sketching more frequently and I could help them to do that, I soon moved away from that straightforward problem-and-solution approach. It may have been that I was undertaking problematisation in other ways. For example, I hope my research findings will be helpful in that as they will provide new knowledge that may encourage spatial design academics and undergraduates to reflect on and make changes to their own practices. However, helpful is not the same as essential, and I do not believe that I ever consciously sought to appear to the gatekeepers or respondents as the essential solution to their problems – indeed, I did not state that these people had problems to which I was pursuing a solution, but rather that I had research questions to which I was seeking answers.

3.11 ‘Moments’ of translation – interessement

The second ‘moment’ of translation involves ‘interessement’ (Callon, 1986, p. 196): a succession of procedures that the researchers use to compel the other actors to fulfill roles that they, the researchers, have created for them during problematisation (Callon, 1986). A variety of tactics and devices can be put to use to bring about interessement, such as ‘…pure and simple force…seduction or a simple solicitation…’ (Callon, 1986, p. 204) Does this apply to my study? It is possible that I defined roles for the respondents, as discussed in section 3.12 ‘Moments’ of translation – enrolment. Moreover, I suspect that I may, whilst attempting to build rapport, have behaved in an overly deferential way with the respondents, and thus unintentionally caused them to feel locked into certain behaviours. Indeed, the phrase on the consent information sheet, ‘I have identified you as possessing knowledge, skills, experiences, ideas and opinions that are of interest and value’, may well have resulted in a form of very mild seduction, even if that was not my intention. That said, I believe that critical reading of the background literature and being a reflexive practitioner have enabled me to keep this risk of interessement in mind, and view the data accordingly.
3.12 ‘Moments’ of translation – enrolment

Various bargains, skirmishes and deceptions may be used in order to make the
interessements a success. These comprise ‘enrolment’ (Callon, 1986, p. 196), the third
‘moment’ of translation. If I did to some extent define roles for others during the study, did I
also adopt strategies to persuade those people to accept them? It seems likely that I did. For
example, having predetermined the roles I expected that the respondents would adopt during
the interviews (see discussion in section 3.11 ‘Moments’ of translation – interessement), I
believe that at times I may have used certain deceptions to lock those respondents into those
roles (for example, by appearing to be curious and open as a way of encouraging them to be
honest rapporteurs, and praising the sketches they revealed as a way of encouraging them to
show more work).

3.13 ‘Moments’ of translation – mobilisation

The fourth ‘moment’ of translation is ‘mobilisation’ (Callon, 1986, p. 196): a collection of
approaches that may be utilised to guarantee that people representing various groups are
able to speak for them. I doubt that mobilisation was employed in this study. As has been
stated, I considered what made the institutions and respondents suitable choices, but I never
saw the respondents as the few speaking for the many. The St Brieuc Bay, scallops and
fishermen had spokespersons who were ‘elected’ (Callon, 1986, p. 208), and it may be that
the main study respondents were also elected, for example because they were chosen by
their gatekeeper or classmates. However, I did not know if this had happened, and believe it
should only be kept in mind as a possibility.

Was I a spokesperson for a particular community? At St Brieuc Bay, the researchers became
representatives of several groups: scholars, the scallop-fishing community and the scallops
themselves (Callon, 1986). I had not presumed to become the head of any relevant
populations – say, spatial design academics or researchers. As this study reached its
conclusions, I believe it began to reveal something about spatial design ideation and
sketchbook material that is worth sharing. Now that the networks of respondents and
gatekeepers have ceased to exist, it seems as though I may be taking on a role as their representative. However, whilst those networks were current, I made no attempt to assume such a role.

3.14 Establishing network stability – material durability

Whilst actor-networks can be delicate and temporary, ANT discusses three interconnected arrangements that may result in comparative stability: ‘Material durability…Strategic durability [and] Discursive stability’ (Law, 2007, pp. 9-10) All of these can be problematic (Law, 2007). Regarding material durability, in this study I did not code the interviews because those events lasted only an hour or so and existed only once – in other words, they had limited material durability. Instead, I coded the video-recordings, which, in comparison, have greater material durability – copies of these exist on my laptop, external hard drive and memory sticks – and the interview transcripts, which, have even greater material durability – they exist as multiple digital copies on my laptop, external hard drive and memory sticks, as attachments to back-up e-mails and in hard-copy form. That said, the video-recording is not the interview, *inter alia* because it has a limited angle of view (Jewett, 2012): it is a version of the interview (Heath *et al*, 2010). Also, the transcript is not the interview because it is a transcript of the video-recording: it is arguably another version of the interview. I rely on them both in part because of their material durability: raw data have been translated into something less complete but more long-lasting (*ibid.*).

3.15 Establishing network stability – strategic durability

I sought strategic durability through the formal research design and techniques (see chapter 4.0 *Research methodology*), but also in more personal approaches I used to stimulate creative and intellectual endeavour – for example: sitting at my favourite table and playing my favourite pieces of music whilst writing. That said, these may not have been the only strategies that impacted on this study. It is possible that the gatekeepers, respondents, and institutions may also have had strategies for establishing durability, ones that were different from mine and perhaps even at odds with them.
3.16 Establishing network stability – discursive durability

Discursive stability comprises ‘...different modes of ordering that...[extend] through people to include technologies and organisational arrangements...’ (Law, 2007, p. 10) These are ‘...different logics...mini-discourses...[which] define conditions of possibility, making some ways of ordering webs of relations easier and others difficult or impossible.’ (Law, 2007, p. 10) The differences between these logics provide a repertoire of responses to the pressures and limitations that may threaten a network, thus increasing its stability (although they may also lead to that network undergoing translation). Thus, for example, it may have been that the top-ranking institution’s gatekeeper wanted to support this study because he saw the institution as being at the cutting-edge of academic developments in spatial design, but there may also have been a wish to control to who was interviewed in order to protect its reputation. These different logics would have enabled me to gain access to the institution, but simultaneously restricted my chances of accessing rich data from its students, a case of discursive stability bringing about network translation.

To me, because this study comprises a rich variety of human and non-human participants interacting with each other in different ways over time, and because their inter-connectedness needs to be considered carefully if my theorising is to be demonstrably robust, ANT is a good fit.

4.0 Research methodology

4.1 Preamble

My methodological stance has throughout this study been relativist and constructivist, rather than positivist. A positivist position has been questioned by researchers investigating social settings because these do not support the principle that there is ‘...only one absolute logic and one form of approach to rational understanding (ie: truth)...’ (Hart, 1998, p. 83) Positivists require that research outcomes are reliable, valid and generalisable; they contend that,
without these criteria, unreliable and/or invalid research might be claimed as ‘truthful’ (Jonson, 2004). Constructivists assert that people ‘...create or construct their own new understandings or knowledge through exploring what they already know and believe as well the ideas, events, and activities with which they come in contact…’ (Rami et al, 2009, p. 9) Relativists argue that the world comprises multiple realities (Mills et al, 2006) and what might be regarded as real, true, normal and correct are all relative to specific ways of thinking within specific contexts:

‘In its strongest form, relativism is the basic conviction that when we turn to the examination of those concepts that philosophers have taken to be the most fundamental…we are forced to recognise that in the final analysis all such concepts must be understood as relative to a specific conceptual scheme, theoretical framework, paradigm, form of life, society or culture.’ (Bernstein, 1983, p. 8)

Relativists regard the positivist criteria of reliability, validity and generalisability as problematic because, *inter alia*, reliable methods do not necessarily produce valid and generalisable results, and they assert that these criteria, although applicable to quantitative research, are not applicable to a qualitative study (*ibid*.). Denzin and Lincoln (2011) and Jonson (2004) recommend that the criteria of dependability, credibility, and transferability are used in qualitative research instead, but I have found that credible, reliable and dependable are synonymous (Roget, 2013) and I am not convinced that generalisability and transferability are significantly different from each other. Moreover, I maintain that reliability (were methods used consistently?) and validity (did I measure what I set out to measure?) are applicable whatever approaches are being used. My response to this linguistic challenge is to seek to undertake a study that is *robust*: in other words, to ensure that the methods used for data collection and analysis are appropriate to the research questions and utilised with rigour; the literature review is relevant to the research questions, and also comprehensive and critical; and the conclusions are thoroughly considered and evaluated, thoroughly informed by the literature review, and provide answers to the research questions. Regarding generalisability, because the data are the outcome of interaction between myself and thirteen participants I do not
regard them representing an entire population, nor the research findings as being
generalisations regarding that student population (see discussion below). The intention of this
study has been to construct theory that increases my understanding of the approaches of a
sample of UK-based spatial design undergraduates to ideation during design development,
thereby creating new knowledge. I hope that this new knowledge will inform my future
teaching practice and also prompt other academics to investigate whether their own students
manifest similar outcomes and, by that means, contribute to wider discussions concerning
undergraduate spatial design education – particularly expectations of what sketchbook
material should comprise in an academic setting, and the formative and summative
assessment of undergraduate spatial design development activity. Thus, this is not a case of
me saying, in effect, ‘The study led to theory which will be generally applicable,’ but, rather,
‘The study led to theory which might be worth investigating in other academic institutions.’

4.2 Grounded theory – a general overview

In essence, grounded theory may be understood as a research methodology that aims to
build theory concerning matters that people regard as being of importance (Glaser, 1978;
Glaser and Strauss, 1967; Strauss and Corbin, 1998). Its data collection methods are
regarded as inductive in that the researcher is not seeking to verify or controvert
predetermined ideas but rather to identify new theory that might increase understanding of
the field of enquiry (Denscombe, 2010). This is not a case of the theory being self-evident in
the data; it must result from rigorous comparative analysis (ibid.). Since its establishment by
Glaser and Strauss in the 1960s, grounded theory has gone through different stages of
development (Mills et al, 2006; Charmaz, 2006; MacDonald, 2001; MacDonald and Schreiber,
2001; Wuest and Merritt-Gray, 2001; Glaser, 1992; Strauss and Corbin, 1990; Strauss, 1987;
Glaser and Strauss, 1967; Glaser and Strauss, 1965). Chronologically, ontologically and
epistemologically, Mills et al (2006) identify three main approaches. The first, predicated on
the work of Glaser, is termed traditional; the second, devised by Strauss and Corbin, is
termed ‘evolved’ in that it is not diametrically opposed to traditional grounded theory but a
development of it (McCann and Clark, 2003a); and the third, predicated on the work of
Charmaz (2006 and 2000), is termed constructivist (Mills et al, 2006). Traditional grounded
theory takes a somewhat positivist stance, proposing that truth emerges from the data in (Mills et al, 2006; Glaser, 1978). ‘Evolved’ grounded theory takes a more relativist stance (Mills et al, 2006), accepting that bias cannot be expunged fully from the research, but the advice that researchers remain objective regarding the data and the participants has elements of positivism and therefore of traditional grounded theorising (ibid.). Constructivist grounded theory places greater emphasis on the researcher’s presence in and impact on the data, analysis and and the resultant conclusions (Charmaz, 2006). Across these different generations some underpinning principles are more or less unvarying (Denscombe, 2010).

Grounded theory seeks to develop theories, rather than to describe things, and prioritises empirical research and connecting analysis closely to what occurs in the here-and-now (ibid.). It provides methodical, adaptable approaches to qualitative data gathering and investigation (Charmaz, 2006), requiring that the field of enquiry is subjected to comparative analysis from a range of viewpoints, potential clues are followed up and emergent ideas are developed. It seeks to produce outcomes that have practical applications and are understood and appreciated by those who are being investigated. It is suitable, inter alia, for small qualitative studies that are carried out by solo investigators with limited funds (Denscombe, 2010), and investigations into ‘human interaction’, which means:

- ‘practical activity and routine situations
- the participants’ points of view.’ (Denscombe, 2010, p. 110)

It requires the assembly of data through:

‘…observations, interactions, and materials that…[are] gather[ed] about the topic…[whilst studying] empirical events and experiences and pursue[ing]…hunches and potential analytic ideas about them.’ (Charmaz, 2006, p. 3)

Key points about grounded theory are that, firstly:

‘[h]ow the analyst enters the field to collect the data, his [or her] method of collection
and codification of the data...integrating of the categories, generating memos, and constructing theory...are all guided and integrated by the emerging theory.' (Glaser, 1978, p. 2)

Secondly, ‘...the social psychology of the analyst; that is, his [or her] skill, fatigue, maturity, cycling of motivation, life cycle interest, insights into and ideation from the data.' (ibid.)

Thirdly, the researcher should enter the setting ‘...with as few predetermined ideas as possible – especially logically deducted a prior [sic] hypothesis [sic].' (Glaser, 1978, p. 3) That said, '[s]ensitivity is necessarily increased by being steeped in the literature...’ (ibid.) and prior reading need not be seen as limiting the grounded theorising.

Fourthly, grounded theory must demonstrate ‘...fit and relevance, and it must work.' (Glaser, 1978, p. 4) In this context, fit means: ‘...the categories of theory must fit the data.' (ibid.); work means: ‘...a theory should be able to explain what happened, predict what will happen and interpret what is happening...’ (ibid.) (it should be noted here that not all forms of grounded theory seek to predict what will happen); and relevance means: ‘...it must be relevant to the action of the area.' (Glaser, 1978, p. 5) ‘Modifiability’ (ibid.) is important: ‘[w]e soon learn...that generation is an ever modifying process and nothing is sacred if the analyst is dedicated to giving priority attention to the data.' (ibid.) Thus, theory is not immutable; it can change. Grounded theory does not seek to challenge other theories as being incorrect, nor to merge with other theories that appear to be correct. ‘It does not, because these other works simply become part of the data and memos to be further compared to the emerging theory to generate an even more dense, integrated theory of greater scope.' (Glaser, 1978, p. 7)

Fifthly, a grounded theorist should not be unduly preoccupied with whether his/her approach is the ‘right’ one: ‘[o]thers may feel, even know in their hearts, that the data could be handled more profitably in other ways, whether theoretically or empirically...Our perspective is but a piece of a myriad of action in Sociology, not the only, right action.' (Glaser, 1978, p. 3) Thus, even if others may think a researcher should have used a different approach, his/her
‘...perspective is but one theory on where theory may profitably come from, and one method of how to obtain it...’ (ibid.)

The essentials of traditional and ‘evolved’ grounded theory may be understood more acutely by considering certain characteristics: theoretical sensitivity, approaches to the literature, the use of coding and diagramming, and the identification of a core category. These are discussed below.

4.3 Traditional and ‘evolved’ grounded theory – theoretical sensitivity

Regarding theoretical sensitivity, traditional grounded theory requires that researchers begin the study with the minimum of preconceptions so that they are able to immerse themselves in the data and respond to them per se without having already decided what was going to be of interest (Glaser 1978). ‘Evolved’ grounded theory shares this requirement but also recommends a range of techniques that can be used to help understand the data. The phrase ‘a minimum of preconceptions’ does not mean that the researcher should necessarily begin with a completely open mind (Denscombe, 2010; Charmaz, 2006). For example, many researchers may already possess a clear understanding of their setting before they begin analysing it, and have already carried out extensive background reading. This can be an advantage if it helps the analyst to keep in mind certain potentialities within the data (Charmaz, 2006; McDonald, 2001).

4.4 Traditional and ‘evolved’ grounded theory – approaches to literature

Regarding the use of underpinning literature, the approaches of traditional and ‘evolved’ grounded theory are in marked contrast. The former contends that that which may concern the field of study could limit, skew or obstruct the analysis of the data (Glaser, 1992). In ‘evolved’ grounded theory, the literature is seen as further data that may help the researcher
4.5 Traditional and ‘evolved’ grounded theory – the use of diagrams

The use of diagrams is vital to the traditional and ‘evolved’ grounded theorising in order to illustrate and interpret the data (Mills et al, 2006). Appendix H shows a sample of the diagrams I produced early on during this study. The earliest of these shows an attempt to represent, and thus to understand, the coding process. Also included are a preliminary illustration of the axial codes produced, and my initial attempts to represent diagrammatically the ideational processes of respondents 07 and 01. These last two diagrams were found not to be helpful, the former because it contained too much written material to comprise an effective visual summary of the codes, and the latter because they were too complex and lengthy to aid understanding, and were thus taken no further.

4.6 Traditional and ‘evolved’ grounded theory – coding

Grounded theorists use coding as a tool for analysis to enable the quantity of data to be reduced to a practicable scale without reducing the quality (Cohen et al, 2011). A code is in essence a way of classifying data so that it can be analysed more conveniently because it enables information to be sought out relatively swiftly, whilst allowing the words to remain as words (ibid.). Through this method, one or more categories may emerge that group the codes together. To begin with, these are usually substantive, but the intention is that in time they are developed to be theoretical categories (Holton, 2007). Glaser (1992) describes three approaches to coding: open (the preliminary stage, leading to the identification of a core category), theoretical (which addresses how the categories and properties interrelate) and the constant comparative method (which should pervade both the open and theoretical coding stages). Strauss and Corbin (1998), having formerly employed more convoluted approaches to coding, introduced a simpler approach termed axial coding that considered categories in terms of conditions, actions/interactions, and consequences of categories. They also proposed the utilisation of the paradigm as an aid to axial coding by stimulating thoughts...
concerning how categories, properties and dimensions inter-relate (ibid.).

4.7 ‘Evolved’ grounded theory – the paradigm

The paradigm is defined as a sequence of stages comprising the causal condition, the phenomenon (or category), the context, the intervening conditions, the action/interactional strategies and the consequences (ibid.).

4.7.1 ‘Evolved’ grounded theory – the causal condition

This is illustrated using the example of a person breaking his/her leg. The broken leg per se is the causal condition. It has properties – it may be a clean break, comprise multiple fractures or be a compound fracture. It also has one or more causes (ibid.) – perhaps the person fell off a step-ladder, tripped over a kerb, or stepped inadvertently into a rabbit hole. In the case of my study, the interviews may be regarded as the causal condition. The properties would include the schedule of interview questions, recording device used, approach I took to the respondent briefing and selection process, and so on.

4.7.2 ‘Evolved’ grounded theory – the phenomenon (or category)

The phenomenon or category are explained in terms of the pain experienced by the person who has broken his/her leg. This pain has dimensions – intensity (how much pain?), duration (how long does it last?), location (where does it hurt?) – and exists within a context (see section 4.7.3 ‘Evolved’ grounded theory – the context) (ibid.). Within my study the phenomena/categories were identified as the respondents’ various approaches to ideation, and to the discussion and showcasing of their sketchbook material during the interviews I conducted.

4.7.3 ‘Evolved’ grounded theory – the context

The context is defined as the specific properties of a phenomenon – for example, how the leg
was broken, and what were the number and type of fracture – and the pain – its duration, location, intensity. These lead to the intervening conditions \textit{(ibid.)} (see section \textbf{4.7.4 ‘Evolved’ grounded theory – the intervening conditions}).

\textbf{4.7.4 ‘Evolved’ grounded theory – the intervening conditions}

The intervening conditions are delineated as the broader structural context – for example, where the leg was broken, whether the patient was alone, and how old the patient was. These influence the action/interactional strategies \textit{(ibid.)} (see section \textbf{4.7.5 ‘Evolved’ grounded theory – the action/interactional strategies}). Regarding my study, I view the interview setting – more (or less) familiar to me and the respondent, more (or less) quiet, more (or less) comfortable to the researcher and the respondent, more (or less) easy to control – as offering key intervening conditions.

\textbf{4.7.5 ‘Evolved’ grounded theory – the action/interactional strategies}

Regarding these, ‘[w]hether one is studying individuals, groups, or collectives, there is action/interaction which is directed at managing, handling, carrying out, responding to a phenomenon.’ (Strauss and Corbin, 1990, p. 104) This can concern alterations over time, activities, and/or structure/systems. Also, ‘…there are always \textit{intervening conditions} that either facilitate or constrain action/interaction.’ \textit{(ibid.)} Thus, to return to the broken leg example, the action/interaction may be to make a splint (but the intervening condition is that one needs first aid training to do this effectively); to go for help (but the intervening condition is that there have to be people nearby); or keep the patient warm (but the intervening condition is that a blanket or coat are required). In the case of my study, the respondents appeared to demonstrate a range of action/interactional strategies. For example:

- Respondent 01 discussed and showcased sketchbook material in an apparently straightforward way, answering the questions asked and showing no more than was requested
• Respondent 07 discussed and showcased sketchbook material in a directive but fairly 'honest' way, revealing what he wanted even if I had not asked for it, but apparently not attempting to deceive

• Respondent 05 discussed and showcased sketchbook material in an apparently misleading way, answering questions not asked, failing to answer questions asked, not discussing work revealed and so on

4.7.6 ‘Evolved’ grounded theory – the consequences

Taking and not taking action both have consequences, as do interaction and non-interaction (Strauss and Corbin, 1990). These may be intentional or otherwise, and/or happening now or in the future; and they may become conditions or context for future actions/interactions. Thus, treating a broken leg may lead to relief from pain (which could be a sub-category). The consequences of my ‘evolved’ grounded theorising may be understood as including the impact of my conclusions on my professional practice, and on spatial design higher education.

4.8 Traditional and ‘evolved’ grounded theory – rationale for research methodology

In this study, I have sought to develop new theory by carrying out qualitative research using data obtained from focused interviews (see chapter 8.0 Analysis and findings), and have pursued outcomes that I believed will have practical applications for me within the spatial design studio teaching environment and will be understood and appreciated by the participants because those outcomes are rooted in their educational experiences. I possessed what I regard as a comparatively clear understanding of the setting before beginning the analysis of it, but, having devised the research questions, did not attempt to test a preconceived theory. Moreover, this is a comparatively small qualitative study and, although I regard the analysis as robust, the sample cannot be construed as representative of the undergraduate spatial design student population. These factors argue that grounded theory is an appropriate methodology. But why use ‘evolved’ rather than traditional grounded
theory? Glaser and Strauss’s (1967) account of grounded theory focuses on the
generalisability of theories and makes reference to the hypothesis. As I have stated in chapter
1.0 **Introduction**, I regard neither of these terms as appropriate. Also, Glaser’s grounded
theory is more post-positivist, Strauss and Corbin’s more constructivist (MacDonald, 2001).

There is no truth without inverted commas; ontologically, there is no reality apart from being
created by participants – this is a Straussian perspective, divergent from Glaser *(ibid.)*. Glaser
says that ‘Grounded theory yields hypotheses and nothing more, to be verified by others if
they should choose to do so.’ (MacDonald, 2001, p. 129) Thus, verification involves another
methodology following on from the grounded theory methodology. This ‘…reflects a traditional
positivist orientation.’ *(ibid.)* ‘Strauss’ position is that theories are first conceived, then
elaborated, and finally checked out. This occurs through the processes of induction,
deduction, and verification, which go on throughout the life of the research project from
beginning to end (Strauss & Corbin, 1990, 1994). Strauss observes that few working
scientists today would make the mistake of believing that discovery and verification stood in
simple sequential relationship to each other (Strauss, 1987). Glaser, however, adheres to this
position.’ (MacDonald, 2001, p. 129) I have not used the words induction, deduction and
verification, but they apply to this study – Strauss’ notion that it is the researcher’s job is
applicable. ‘In constructivist inquiry, however, discovery and verification are viewed as
inseparable, synergistic processes carried out in close relationship.’ *(MacDonald, 2001, p.
130)* Thus, my approach was more constructivist in that it involved me moving frequently
between discovery and verification. ‘For both of them, categories emerge from the data.
Through a process of constant comparison, these categories are ‘tested’ against the data so
that only those concepts that earn their way into the theory, by virtue of appearing over and
over again, will ultimately be integrated. Glaser himself says that the core category must be
proven over and over again. ‘Theoretical sampling is a way of checking on the emerging
conceptual framework, rather than for verifying pre-conceived hypotheses’ (Glaser, 1992, p.
39). ‘The data constantly check deductions that lead nowhere’ (Glaser, 1992, p. 40). These
statements imply some notion of verification, if not in the traditional sense of the word.’
(MacDonald, 2001, p. 130)
For these reasons, I consider the ‘evolved’ grounded theory approach to be highly appropriate for the study.

4.9 Traditional vs ‘evolved’ grounded theory

A number of arguments led me to choose ‘evolved’ grounded theory for this study, rather than its traditional precursor. According to MacDonald, Glaser’s grounded theory is more post-positivist and Strauss and Corbin’s more constructivist (MacDonald, 2001); as is noted in section 1.2 History and context, my position was constructivist from the study’s outset. Furthermore, ‘evolved’ grounded theory asserts that category’s properties can be positioned along a dimensional range (ibid.); as is noted in section 4.13 Axial coding, I found dimensions to be extremely helpful during the analysis. That said, I did not use all of ‘evolved’ grounded theory’s toolkit. Strauss and Corbin propose ‘…a set of techniques for enhancing theoretical sensitivity during coding: detailed analysis of a word, the flip-flop technique, far out comparisons, and waving the red flag.’ (Strauss & Corbin, 1990, pp. 84-93) I found these to be unwieldy and completely unnatural to my coding process, and I agreed with Glaser’s argument that they are unnecessary in open coding (Glaser, 1992). I also found myself more comfortable with the neutral questions that Glaser asks during coding: What is this a study of? and What property of what category does this incident indicate? (ibid.) Meanwhile, I agreed with those who have commented that Strauss and Corbin's procedures are ‘…overly ‘formulaic’ and rule bound.’ (MacDonald, 2001, p. 131)

Strauss introduced axial coding in 1987 and expanded on it in 1990; it is not a Glaser method (MacDonald, 2001). It comprises ‘…a set of procedures whereby data are put back together in new ways after open coding by theoretically linking categories using what they call a ‘coding paradigm.’” (MacDonald, 2001, p. 131) Glaser argues that the coding paradigm is just another name for his ‘6C coding family’ (causes, contexts, contingencies, consequences, covariances, and conditions)’ (MacDonald, 2001, pp. 131-132). MacDonald, meanwhile, notes that Strauss’ coding paradigm and Glaser’s 6C coding family share certain similar categories: the 6C coding family is static and linear, ending in consequences; in Strauss’s
paradigm, actions lead to consequences which may feed into further actions. Indeed, McDonald argues that there is considerable overlap between traditional and ‘evolved grounded theory:

‘In describing the coding paradigm, Strauss has elaborated and reconceptualised the 6C coding family in a way that is consistent with his own meta-theoretical perspective.’ (MacDonald, 2001, p. 133)

A key component of ‘evolved’ grounded theory is the conditional matrix (MacDonald, 2001). This is predicated on the notion that ‘[c]onsequences result from action/interaction and may subsequently influence conditions at various levels or become new conditions that affect the next action/interaction sequence…[C]ontingencies may emerge that change conditions at one or more levels. These contingencies pose problematic and/or unanticipated situations that must be managed…’ (MacDonald, 2001, p. 133) This accords with my understanding of the research setting, but is rejected by Glaser (MacDonald, 2001) who argues that the research must depend on what emerges, whilst Strauss and Corbin argue that the conditional matrix ‘…helps the analyst to be theoretically sensitive to the range of conditions that might bear upon the phenomenon under study…[and] enables the analyst to be theoretically sensitive to the range of potential consequences that results from action/interaction, and…assists the analyst to systematically relate conditions, actions/interactions, and consequences to a phenomenon.’ (MacDonald, 2001, p. 134) Citing Guba and Lincoln (1989), MacDonald outlines that,

‘[i]n conventional positivist and post-positivist inquiry, discovery is a precursor to verification. Theory emerges from the discovery phase (pre-inquiry) and then is subjected to verification in the inquiry phase.’ (MacDonald, 2001, p. 129)

Meanwhile, Guba and Lincoln see constructivist inquiry as ‘…fully competent to carry out both discovery and verification…’ (Guba and Lincoln, 1989, p. 114). Thus, it would seem that Strauss and Corbin’s definition of verification ‘…is closer to the constructivist view, while
Glaser’s is more positivist.’ (MacDonald, 2001, p. 130)

4.10.1 Open and focused coding of text

The coding process begins with open coding: the preliminary discovery of concepts within the data (Strauss and Corbin, 1998; Charmaz, 2006; Cohen et al., 2011). In this study, the data comprised two broad groupings: the content of the interviews as evidenced in the video-recordings and transcripts, and my theorising about these using an interpretative approach (Strauss and Corbin, 1998). Open coding requires that the data are studied closely to prompt thoughts and ideas (Charmaz, 2006), separated into distinct elements and subjected to analysis (Strauss and Corbin, 1998). The process may not in itself enhance comprehension, nor lead to significant revelations, but it can help the researcher to dig deeper by carrying out ‘microanalysis’ (Strauss and Corbin, 1998, p. 110) which involves making cross-comparisons, and its intention is to identify the breadth of possible interpretations (Strauss and Corbin, 1998).

Before starting work, it is helpful to decide what items will be openly coded (ibid.). These may include a certain occurrence, act, or point of view; the use of a predetermined phrase; or evidence of a specific sense or sentiment (Denscombe, 2010). Regarding the text, I anticipated that the items to be coded would include:

- statements concerning the respondent’s ideation process and ideational moves (for example, which moves were made, why they were made, what influenced their being made, and what comment/s the respondent offered on the success or otherwise of their being made)
- ideational moves revealed in the sketchbook material (for example, whether a paper-based freehand sketch was a perspective view, or a diagram; whether a photograph appeared to have been taken by the respondent or someone else)
In doing this, I was endeavouring to delineate key acts which underpin key elements of the data, identify unspoken suppositions, find explanations for actions, clarify the importance of the things said and done by the respondent, and spot mismatches (Charmaz, 2006).

In open coding, it is also necessary for the analyst to decide on which encoding units will be used (Strauss and Corbin, 1998). It can be helpful to analyse each line and word of text (Strauss and Corbin, 1998; Charmaz, 2006): word-by-word coding may be beneficial when studying documents, internet data and so on, and line-by-line coding is suitable for examining ‘…interviews, observations, documents, or ethnographies and autobiographies.’ (Charmaz, 2006, p. 50) Whole sentences or paragraphs may also be coded (Strauss and Corbin, 1998), as may incidents (Charmaz, 2006). Within this study, I found that, regarding ideational moves, a unit of data could comprise a handful of words – for example, respondent 04: ‘They’re just pictures…’; and respondent 01: ‘…I got excited…’ – and also a more discursive exchange with myself – for example:

GL ‘What are you using the writing for here?’
Respondent 01 ‘To explain my ideas.’
GL ‘To whom?’
Respondent 01 ‘To my lecturer…’
GL ‘So you knew…?’
Respondent 01 ‘So I knew exactly what I wanted…’

Where might a unit of data begin and end (Charmaz, 2006)? To establish this, I worked my way through each video-recording frame-by-frame and each transcript word-by-word. I found that the unit parameters could be determined using a range of means. For example, the turn of a page, a pointing action, a comparatively lengthy pause, a statement by myself such as ‘What’s next?’, or my asking a new question could indicate the start or end point. That said, I did not apply these complacently or automatically but read and re-read the transcript, listened repeatedly to the video-recording, and reflected carefully before making a decision.
Codes emerge gradually, and the intention is that they form categories, concepts and theories that ultimately encapsulate the meanings embedded in the data (Denscombe, 2010). In my study, this process involved grouping the codes together around concepts (Denscombe, 2010) which were related to the investigation, and clustering into categories those concepts I identified as being connected to the same occurrence/experience/happening (Corbin and Strauss, 1990). Concepts are the components that are used to construct theory. They ‘...help to explain the phenomenon...’ (Denscombe, 2010, p. 115) – indeed, a concept may also be understood as ‘...a labelled phenomenon.’ (Strauss and Corbin, 1998, p. 103) They form the keystone for the creation of theories that ‘...provide an account of things and...explain why things happen as they do.’ (Denscombe, 2010, p. 115) The context is key here – for example, whilst one researcher may designate ‘...birds, planes, and kites as ‘flight’...’, another may label them as ‘...‘instruments of war’ because...the birds might be used as carrier pigeons delivering messages to troops behind enemy lines, the kites as signals of an impending attack, and the planes as troop and supply carriers bringing in much needed relief.’ (Strauss and Corbin, 1998, p. 114)

4.10.2 Open and focused coding of sketchbook material

Regarding the sketchbook material, I viewed the content of the video-recordings in a videographic manner to gather ‘rich non-verbal clues’ (Jewett, 2012, p. 3), and utilised prompt reflexive practice (Jewett, 2012). As discussed in section 3.5 Translation and domestication, I used the fast-forward, rewind and pause controls to examine the video-recordings swiftly and selectively (Heath et al, 2010). This enabled time to be ‘...both preserved and interfered with...’ (Jewett, 2012, p. 4), thereby allowing the data to be seen in new ways, making new discoveries possible. In order to identify encoding units, I focused on comparatively short sequences and explored these at a micro-analytical level. In general, I defined the beginning and end of a sequence as being the turning of a page (unprompted or prompted), or an equivalent move such as the bringing into view, or removal from view, of a loose sheet of sketchbook material or a laptop screen containing digital images. Regarding ideational moves, I sought within these encoding units to identify and classify each paper-
based freehand sketch; item of text (discrete as well as annotation to other sketchbook material; hand-written as well as printed); graphic symbol (arrow lines, circles and other shapes used diagrammatically; and the underlining and/or highlighting of material); photograph (taken by the respondent or another); item of three-dimensional work; and other features. Coding in this manner involved a process of interpretive, reflexive, visual analysis of the video-recording. For example, in figure 2 I used this approach to determine:

- whether the hand-written text on the left-hand page concerned the project being discussed (this could not be presumed without reading it – it may instead have comprised, say, seminar or lecture notes, or research for an essay assignment)
- whether any or all of the paper-based freehand sketches on the right-hand page concerned the project being discussed (this could not be presumed – some or all of them may instead have been random doodles or work for a different assignment)
- whether the hand-written text on the left-hand page concerned any or all of the sketches on the right-hand page, and whether the hand-written triple-underlined word ‘Patterns?’ on the right-hand page concerned any or all of the sketches on that page (this could not be presumed – it may have been written for another reason)
- how many sketches there were on the right-hand page (one of them appears to have been crossed out but may not have been; two appear to overlap but may instead be one more complex sketch)
In figure 3 I used the approach to determine:

- whether the photographs showed the site for the project or one or more other sites, perhaps as design precedent research
- whether respondent 11 took the photographs or obtained them from another source
In figure 4 I used the approach to determine:

- whether the sketchbook material showed a sketch plan and a sketch elevation, or plan and elevation sketch diagrams

I was mindful throughout this process that the analysis of video-recorded material can lead to the fracturing of the data (Jewett, 2012), and I took pains to ensure that all coded units were reviewed within the context of the video-recording as a whole. I was also mindful that, as discussed above, the video-recording can be supplanted by the transcript of it thus removing the spoken words and other text-based data from their broader context (ibid.). Frequent viewing of the video-recordings during analysis was thus carried out (Heath et al, 2010). The challenges of data overload are discussed at various points in this thesis, but is should be noted here that the use of video-recorded material can exacerbate these challenges (Jewett, 2012). Snell (2011) advises that qualitative researchers do not respond by focusing only short sequences of video material but rather use software packages to sift, organise, encode and analyse somewhat larger sequences. However, the need for a highly reflexive interpretive approach to the data argued against this approach and I employed instead ‘…iterative cycles of data collection and analysis…’ (Jewett, 2012, p. 6) to address tackle data overload.
Should it be assumed that the presence of the camcorder per se had no impact on the respondents? This assumption might seem persuasive in that the respondents did not appear during their interviews to acknowledge that they were being interviewed, but, as Lomax and Casey (1998) state, not looking at the camera may denote that they were actively ignoring it rather than unaware of it.

### 4.11 Open and focused coding in action

I approached open coding mindful that I may discover that more codes were needed, the wording of existing codes needed to be changed, and/or there were codes that needed to be filled by data gathering during subsequent interviews. Data analysis and data gathering thus occurred more or less simultaneously (Charmaz, 2006; Strauss and Corbin, 1998). I regarded this process as immersive, iterative and highly reflexive (Cohen et al, 2011; Charmaz, 2006) and therefore likely to minimise the risk of compromising the later analysis by forming ill-considered first impressions. Initially, the open codes were given provisional labels. When later data appeared to share key traits with that already encoded, the same code/sub-code was applied (Strauss and Corbin, 1998). Each new application prompted me to review the code/sub-code more widely across the data and analysis using the constant comparative method (Strauss and Corbin, 1998), which in some cases resulted in it being deemed to be a good fit, in others in it being amended. I used this approach to ensure that the codes and sub-codes I applied were clear, accurate, detailed, exhaustive, consistent and suitably distinct keeping in mind the risk that the uncommon or unanticipated may be under-valued (Cohen et al, 2011). The result of this process was a hierarchy of many subordinate and superordinate codes (ibid.), moving from the more general to the more specific. A sample of an openly coded transcript is shown in [figure 14](#); see Appendix D for an example of a complete openly coded transcript.
The open codes identified are shown in tables 1 to 3; it is understood that they form part of chapter 8.0 Analysis and findings but they are included here to help explain the research methodology used.

**EXP-** Explain visuo-spatial information

**INV-** Investigate visuo-spatial matters

**REF-** Reflect
Table 1 – Open codes generated during pilot study

Some of these codes spawned a relatively small number of sub-codes – for example, see table 2.

Table 2 – Sample of open codes, sub-codes and sub-sub-codes generated during pilot study

ADV- Follow the tutor’s advice
EXAMP- Use a technique following the example of one or more students
PREV- Mention previous education/training
DESDEC- Make a design decision
DESSPEC- Make a design speculation
TERM- Use unexpected words to describe design activities/outcomes
DESSURP- Experience a design surprise
EMOT- Mention emotional response to work carried out
REVISIT- Revisit work produced previously
EVAL- Evaluate a sketchbook technique used

EVAL- Evaluate a sketchbook technique used
EVAL-DRG- Evaluate a paper-based freehand sketching technique used
EVAL-DRG-TIME- Evaluate a paper-based freehand sketching technique in terms of the time taken to use it

(This is not a complete list of sub-codes concerning the EVAL code)
Some of the codes spawned a relatively large number of sub-codes – for example, see table

3.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXP</td>
<td>Explain visuo-spatial information</td>
</tr>
<tr>
<td>EXP-DRG</td>
<td>Explain visuo-spatial information using paper-based freehand sketching</td>
</tr>
<tr>
<td>EXP-DRG-PLAN</td>
<td>Explain visuo-spatial information using paper-based freehand sketches that are plan (orthographic) views</td>
</tr>
<tr>
<td>EXP-DRG-PLAN-START</td>
<td>Explain visuo-spatial information using paper-based freehand sketches that are plan (orthographic) views and are in a style imitating other work elsewhere</td>
</tr>
<tr>
<td>EXP-DRG-PLAN-ENVIR</td>
<td>Explain visuo-spatial information (environmental) using paper-based freehand sketches that are plan (orthographic) views</td>
</tr>
<tr>
<td>EXP-DRG-PLAN-PROC</td>
<td>Explain visuo-spatial matters using paper-based freehand sketches that are plan (orthographic) views to indicate process (the space/product etc in use/motion)</td>
</tr>
<tr>
<td>EXP-DRG-PLAN-SCALE</td>
<td>Explain visuo-spatial information to scale using paper-based freehand sketches that are plan (orthographic) views</td>
</tr>
<tr>
<td>EXP-DRG-SECT</td>
<td>Explain visuo-spatial information using paper-based freehand sketches that are section (orthographic) views</td>
</tr>
<tr>
<td>EXP-DRG-SECT-SCALE</td>
<td>Explain visuo-spatial information to scale using paper-based freehand sketches that are section (orthographic) views</td>
</tr>
<tr>
<td>EXP-DRG-PERSP</td>
<td>Explain visuo-spatial information using paper-based freehand sketches that are perspective (3D) views</td>
</tr>
<tr>
<td>EXP-DRG-PERSP-FEEL</td>
<td>Explain visuo-spatial information (qualities of space) using paper-based freehand sketches that are perspective (3D) views</td>
</tr>
<tr>
<td>EXP-DRG-PERSP-ENVIR</td>
<td>Explain visuo-spatial information (environmental) using paper-based drawings that are perspective (3D) views</td>
</tr>
<tr>
<td>EXP-DRG-PERSP-PROC</td>
<td>Explain visuo-spatial matters using paper-based freehand sketches that are perspective views to indicate process (the space/product etc in use/motion)</td>
</tr>
</tbody>
</table>
Table 3 – Sample of open codes, sub-codes and sub-sub-codes generated during pilot study (list not a complete)

These codes, sub-codes and sub-sub-codes I then tabulated by returning to the video-recordings, reviewing the data once more (Charmaz, 2006), extracting excerpts from the interviews and adding those to the table, and colour-coding the table’s cells on broader themes to distinguish codes and sub-codes concerning paper-based freehand perspective sketches from those concerning plan-based approaches, and word-based approaches. A sample page of the table is shown in table 4.
University of Bedfordshire  
Institute for Research in Education (IReD)  

PILOT STUDY  

REVISED TABLE OF CODES AND SUB-CODES  

Key:  
Blue asterisks = Respondent 01 (re-encoded) – Level 5 (but discussing Level 4 and 5 sketchbooks)  
Green asterisks = Respondent 02 (encoded) – Level 5  
Orange asterisks = Respondent 03 (re-encoded) – Level 5  
Cherry Asterisks = Respondent 04 (re-encoded) – Level 6  
Pale Blue Asterisks = Respondent 05 (encoded) – Level 6  
Pink Asterisks = Respondent 06 – Level 4  

<table>
<thead>
<tr>
<th>Perspective-related Codes and Sub-Codes:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan-related Codes and Sub-Codes:</td>
<td></td>
</tr>
<tr>
<td>Section-related Codes and Sub-Codes:</td>
<td></td>
</tr>
<tr>
<td>Elevation-related Codes and Sub-Codes:</td>
<td></td>
</tr>
<tr>
<td>Word-related Codes and Sub-Codes:</td>
<td></td>
</tr>
<tr>
<td>Term-related Codes and Sub-Codes:</td>
<td></td>
</tr>
<tr>
<td>Codes and Sub-Codes identified as requiring further tabulation and analysis, but the work not yet done:</td>
<td></td>
</tr>
<tr>
<td>Diagram-related Codes and Sub-Codes:</td>
<td></td>
</tr>
<tr>
<td>Cad-related Codes and Sub-Codes:</td>
<td></td>
</tr>
<tr>
<td>Res-related Codes and Sub-Codes:</td>
<td></td>
</tr>
</tbody>
</table>
Table 4 – Colour-coded table of codes, sub-codes and sub-sub-codes generated during pilot study (sample)

<table>
<thead>
<tr>
<th>Theme</th>
<th>Theme Definition</th>
<th>Code</th>
<th>Code Definition</th>
<th>Sub-Code</th>
<th>Sub-Code Definition</th>
<th>Sub-Code</th>
<th>Sub-Code Definition</th>
<th>Sub-Code</th>
<th>Sub-Code Definition</th>
<th>Sub-Code</th>
<th>Sub-Code Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXP</td>
<td>Explain visuo- spatial information</td>
<td>EXP-DRG</td>
<td>Explain visuo- spatial information using paper-based freehand sketching</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo- spatial information to others using paper-based freehand sketching</td>
<td>EXP-DRG-PLAN-QUICK</td>
<td>Explain visuo-spatial information using paper-based freehand sketching that are plan (orthographic) views</td>
<td>EXP-DRG-PLAN</td>
<td>Explain visuo-spatial information using paper-based freehand sketching that are plan (orthographic) views</td>
<td>EXP-DRG-PLAN</td>
<td>Explain visuo-spatial information using paper-based freehand sketching that are plan (orthographic) views</td>
</tr>
<tr>
<td>EXP</td>
<td>Explain the construction aspects of visuo-spatial information using photograph s</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo- spatial information using paper-based freehand sketching produced quickly and without neatness</td>
<td>EXP-DRG-QUICK</td>
<td>Explain visuo-spatial information by manipulating (drawing over) the images of others</td>
<td>EXP-DRG-QUICK</td>
<td>Explain visuo-spatial information using paper-based freehand sketches that are section (orthographic) views</td>
<td>EXP-DRG-QUICK</td>
<td>Explain visuo-spatial information using paper-based freehand sketches that are section (orthographic) views</td>
<td>EXP-DRG-QUICK</td>
<td>Explain visuo-spatial information using paper-based freehand sketches that are section (orthographic) views</td>
</tr>
<tr>
<td>EXP</td>
<td>Explain visuo- spatial information using physical models but find it difficult</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo-spatial information using paper-based freehand sketching produced quickly and without neatness</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo-spatial information by manipulating (drawing over) the images of others</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo-spatial information using paper-based freehand sketches that are section (orthographic) views</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo-spatial information using paper-based freehand sketches that are section (orthographic) views</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo-spatial information using paper-based freehand sketches that are section (orthographic) views</td>
</tr>
<tr>
<td>EXP</td>
<td>Explain visuo- spatial information using physical models</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo-spatial information using paper-based freehand sketching produced quickly and without neatness</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo-spatial information by manipulating (drawing over) the images of others</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo-spatial information using paper-based freehand sketches that are section (orthographic) views</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo-spatial information using paper-based freehand sketches that are section (orthographic) views</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo-spatial information using paper-based freehand sketches that are section (orthographic) views</td>
</tr>
<tr>
<td>EXP</td>
<td>Explain visuo- spatial information using the written word</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo-spatial information using paper-based freehand sketching produced quickly and without neatness</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo-spatial information by manipulating (drawing over) the images of others</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo-spatial information using paper-based freehand sketches that are section (orthographic) views</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo-spatial information using paper-based freehand sketches that are section (orthographic) views</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo-spatial information using paper-based freehand sketches that are section (orthographic) views</td>
</tr>
<tr>
<td>EXP</td>
<td>Explain visuo- spatial information using CAD drawing</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo-spatial information using paper-based freehand sketching produced quickly and without neatness</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo-spatial information by manipulating (drawing over) the images of others</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo-spatial information using paper-based freehand sketches that are section (orthographic) views</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo-spatial information using paper-based freehand sketches that are section (orthographic) views</td>
<td>EXP-DRG-Q</td>
<td>Explain visuo-spatial information using paper-based freehand sketches that are section (orthographic) views</td>
</tr>
</tbody>
</table>

Table 4 – Colour-coded table of codes, sub-codes and sub-sub-codes generated during pilot study (sample)
This tabulation and colour coding I regarded as a form of focused coding. Focused codes are more targeted, discerning, theoretical and over-arching than open codes, and require that the researcher uses what appear to be the most noteworthy and/or recurrent open codes to filter through the earlier data in order, *inter alia*, to establish how appropriate those earlier codes are (*ibid.*). This is an iterative process, requiring the researcher’s detailed interaction with the data. It enables prejudices about the research to be identified, and new analytical strands and potential inter-connections to become evident (*ibid.*).

By grouping together the codes, sub-codes and sub-sub-codes identified within certain more theoretical categories that appeared to offer a deeper understanding of the data, it was possible for me to decrease the number of units of analysis (Strauss and Corbin, 1998). By enumerating each occurrence of the code, sub-code and sub-sub-code and tabulating that information I was able to begin to recognise which appeared most frequently and where there appeared to be patterns (Cohen *et al.*, 2011). It might be asked why I was enumerating items of data during a qualitative study, however, it should be noted that, ‘[e]ven in the case of mainly qualitative research it may sometimes be sensible to include certain simple quantifications.’ (Mauthner and Doucet, 2003, p. 410) Thus, in order to gain an understanding of how the respondents were approaching design ideation it was regarded as necessary to include this element of quantification. These tasks were, arguably, steps towards axial coding (see discussion in section 4.13 *Axial coding*) because they ‘...connect[ed] related codes and subcategories into a larger category of common meaning that...[was] shared by the group of codes in question...’ (Cohen *et al.*, 2011, p. 561)

### 4.12 Open and focused coding – key difficulties encountered

Open and focused coding can present the researcher with a number of difficulties, including: being overwhelmed by too much data; allowing initial speculations to influence unduly the subsequent data collection and analysis; finding that certain important data sources are inaccessible; making excessive use of easy-to-access data; focusing on data that appears to support the researcher’s speculations and neglecting that which appears not to; under- or
over-estimating the value of unexpected data; feeling more confidence in the final conclusions than is reasonable; and misinterpreting co-incidence as connection (Cohen et al, 2011). Also, although it is recommended that data gathering and analysis occur more or less simultaneously, early coding can be problematic in that it may impact disproportionately on subsequent data gathering and examination (ibid.). I believe that most of these potential difficulties were avoided in this study by the maintenance of a highly reflexive approach. That said, I am aware that I experienced data overload because the range and quantity of open codes allocated grew quickly to such an extent that they could not be viewed synoptically, recollected clearly or analysed effectively. In addition, I found that many of the open codes, instead of being ‘…short, simple, active and analytic…’ (Charmaz, 2006, p. 50), were wordy, nuanced and descriptive, and this made the analysis challenging.

Furthermore, whilst carrying out open and focused coding, I made extensive use of memos (Strauss and Corbin, 1998), but I found that this presented me with certain difficulties. Memos are intended to document reflexive practice, including speculations, queries and plans for subsequent data (ibid.), and can themselves become data (Cohen et al, 2011). I, however, regarded it as appropriate to write memos as brief margin notes only when data were encountered that I could not encode. Thus, as figure 5 shows, the sub-code EMOT-POS was added to the statement, ‘It’s telling things you didn’t know, but now that you’ve done it, I don’t think you’re saying you’re going to produce a lot more.’ I did this because I regarded the sub-code as appropriate, but I did not then produce a memo to reveal the reasons for the allocation. On the other hand, I added memos 05/43 ‘AN INTERESTING INSIGHT’ and 05/44 ‘NOT MUCH DRAWING DONE’ in figure 5 to identify points of interest to me, but I revealed little about why they were of interest, what action/s I was considering taking as a consequence, what choices were made from these and why they were made. Having reflected on my memo-ing process I realised that it needed to be far more extensive and detailed and include each encoding of the data.

Moreover, I encountered a difficulty that may have been exacerbated by my poor memo-ing. Midway through the main study, I reviewed the results of the open and focused coding and
found that my general understanding of the field of investigation had increased and I had gained a particular insight, which I summarised as:

‘Each respondent’s approach to design ideation seems to have been as distinct as their signature. The toolkit of paper-based freehand perspective sketches, physical models, visuo-spatial research etc used to build the approach appears to have been broadly consistent across all the respondents but each seems to have used these in markedly different ways.’

Unfortunately, after a period of reflexivity, I determined that this insight was basically descriptive: ‘…a low level theory which…I found] difficult to ‘scale up’ appropriately.’ (Charmaz, 2006, p. 139) This rudimentary proposal lacked the theoretical muscle to allow me to claim that new knowledge had been found.

Finally – and most importantly – I realised mid-way through the main study that I was expecting too much from open and focused coding, and from trying to theorise at an abstract level without having carried out appropriate analysis. Strauss and Corbin (1998) advise the grounded theorist who has completed open and focused coding to carry out axial coding and I realised that it was necessary to follow their advice.

**4.13 Axial coding**

During open and focused coding it is probable that, in a typical study, the analysis will have produced numerous codes. These may not all be equally important, so it needs to be determined which should be developed further, which discarded (Charmaz, 2006; Denscombe, 2010) and which incorporated into broader concepts (Denscombe, 2010). This means choosing codes that condense the data most efficiently and insightfully, and appear to have the potential to lead to broader theory (Charmaz, 2006), an approach that is called axial coding.
Axial coding is constructivist in that it regards theoretical concepts as explanatory frameworks that enable ‘...an abstract understanding of relationships...[and] subsume lesser categories and by comparison hold more significance...[and] account for more data...’ (Charmaz, 2006, p. 140). It involves rebuilding data taken apart during open coding, by grouping codes and sub-codes into categories and sub-categories, and relating these ‘...[along the lines of their properties and dimensions] to form more precise and complete explanations about phenomena...’ (Strauss and Corbin, 1998, p. 124). These explanations should not depict simplistic cause-and-effect connections between or within categories or sub-categories, but form a dialogue that conveys ‘...readers along a complex path of interrelationships, each in its own patterned way, that explains what is going on.’ (Strauss and Corbin, 1998, p. 130)

Properties, within this context, are the traits that delineate a category or concept and help it to be understood; dimensions indicate the extent to which the properties change across the data (Strauss and Corbin, 1998). Having identified the properties of a category or sub-category, the researcher should endeavour to position each property along the dimensional range. For example, the reader may consider a flower as having the properties of colour, form, size and lifespan. Each of these has dimensions – the colour may be less or more bright, the size smaller or larger, the lifespan shorter or longer (ibid.). During axial coding, the aim is to connect categories and/or sub-categories at a dimensional level, for example by devising patterns ‘...when groups of properties align themselves along various dimensions.’ (Strauss and Corbin, 1998, p. 117)

Each category and sub-category can be labelled in a number of ways. Some labels may be derived from concepts that have emerged from the data, and be selected because they appear to have a wide embrace and be less descriptive; others may result from the researcher gaining understandings that appear to help him/her comprehend what is happening; others may be derived from concepts already defined in literature (although this may lead to misinterpretations and erroneous conclusions, and so should be done with care) (Strauss and Corbin, 1998). I provided each category and sub-category with a descriptive label (for example: Produces and uses paper-based freehand sketch diagrams to ask (and attempt to answer) questions about space planning concerning his/her design proposals), a
unique number ([33]), in the case of the example just given), and a colour-code (to aid swift recognition once tabulated and in memos, but shown in this thesis only in the figures, and in the Appendices).

As was mentioned in section 4.12 Open and focused coding – key difficulties encountered, I realised mid-way through the main study that trying to theorise at an abstract level without having carried out axial coding was infeasible. Accordingly, after background reading regarding axial coding (summarised above), I defined and carried out a series of axial coding tasks, summarised as follows:

1. Return to the video-recordings and transcripts for further analysis.
2. Review the open and focused codes and sub-codes that I had devised.
3. Recode the data as categories and sub-categories with properties and dimensions.
4. Review each of these categories and sub-categories, changing the wording of some, coalescing some and deleting others, to make the final list more appropriate and of manageable length.
5. Explore axial connections between these categories and sub-categories at a dimensional level.

Whilst doing this, I worked in what I regard as a highly reflexive manner, producing numerous memos within which multifarious thoughts about the data were expressed, prompted by the following key questions:

- What might a respondent’s words and phrases indicate?
- In what other contexts might s/he have used the same words and phrases?
- What other words and phrases might s/he have used instead to convey the same meaning/s?
- How can it be determined whether a given paper-based sketch is a plan diagram or a plan?
• How can it be determined whether an item of hand-annotation is linked to a nearby paper-based freehand sketch?
• Did the respondent turn the page having decided to, or because I prompted it, or for some other reason?
• Why might the respondent have laughed at a given point during the interview?
• Where should I go next on this analytical journey?

It is my contention that the memos I produced during axial coding have formed an essential component of this study (see chapter 8.0 Analysis and findings). These memos, as is stated in section 4.12 Open and focused coding – key difficulties encountered, constitute data. Thus, they should be placed in chapter 8.0 Analysis and findings. However, they are shown here to help the reader to understand the methodological journey I was undertaking – see figure 6.
Gl. "...So this is...helping you to understand the existing context...for this...?"

07..."Yes..." What should I categorize here? These drawings describe an existing context, but they are not "paper-based freehand sketches" but rather "paper-based drawings hand-drawn using a straight edge", and they are scale drawings - thus they were created using - and therefore contain dimensional information. Regarding the Sub-Category allocated earlier...[05] Produces and uses paper-based plan drawings, hand-drawn using a straight edge, to explain dimensional information on a spatial design speculation matter to him/herself or others in response to a pre-existing spatial design speculation matter. I had modified it from [06] Produces and uses paper-based plan drawings, hand-drawn using a straight edge, to explain dimensional information on a spatial design speculation matter to him/herself or others because I already argued that I cannot be sure whether drawings were produced to "explain" to him/herself or others or to "ask questions" about design proposals: these two tasks may have areas of overlap. Also, I had omitted the reference to "dimensional information" because I saw little value in having two Sub-Categories, one that concerned straight edge-based drawings produced to provide "dimensional information" and one that concerned straight edge-based drawings produced without a desire to provide "dimensional information". In fact, almost all of the plan drawings produced with straight edges I have seen during these interviews have arguably concerned "dimensional information", if only because they could not have been drawn without considering "dimensional information". Thus...[03] Produces and uses paper-based isometric drawings, hand-drawn using a straight edge, to explain dimensional information on characteristics of a spatial design speculation matter to him/herself or others becomes... [04] Produces and uses paper-based isometric drawings, hand-drawn using a straight edge, to explain dimensional information on characteristics of a spatial design speculation matter to him/herself or others in response to a pre-existing spatial design speculation matter. [02] Produces and uses paper-based elevation drawings, hand-drawn using a straight edge, to explain dimensional information on characteristics of a spatial design speculation matter to him/herself or others becomes...[01] Produces and uses paper-based elevation drawings, hand-drawn using a straight edge, to explain dimensional information on characteristics of a spatial design speculation matter to him/herself or others in response to a pre-existing spatial design speculation matter: and...[00] Produces and uses paper-based perspective drawings, hand-drawn using a straight edge, to explain dimensional information on characteristics of a spatial design speculation matter to him/herself or others becomes...[49] Produces and uses paper-based perspective drawings, hand-drawn using a straight edge, to explain dimensional information on characteristics of a spatial design speculation matter to him/herself or others in response to a pre-existing spatial design speculation matter. There is also...[33] Produces and uses paper-based isometric drawings, hand-drawn using a straight edge, to explain dimensional information on characteristics of a spatial design speculation matter to him/herself or others becomes...[32] Produces and uses paper-based isometric drawings, hand-drawn using a straight edge, to explain dimensional information on characteristics of a spatial design speculation matter to him/herself or others in response to a pre-existing spatial design speculation matter: and...[31] Produces and uses paper-based perspective drawings, hand-drawn using a straight edge, to explain dimensional information on characteristics of a spatial design speculation matter to him/herself or others becomes...[30] Produces and uses paper-based perspective drawings, hand-drawn using a straight edge, to explain dimensional information on characteristics of a spatial design speculation matter to him/herself or others in response to a pre-existing spatial design speculation matter. How do I know that these drawings were produced in conjunction with each other? Well, most of them were used in what I would regard as a suite of drawings showing...to scale (or, at least, in proportion): isometric, elevation, plan and perspective views. Even the diagram was drawn over a plan to scale. Also, the drawings may have been tabbed in response to me saying... "...so you surveyed the space..." Although he shares some thoughts about Peter Calthorpe, 07 then turns to leaf through a pile of larger (A2) sheets which he had placed on the floor, at which point I said..."...survey drawings coming up..." Also, 07 tabbed all these drawings one after the other, to my eyes as a suite of connected drawings.

It would appear that these drawings were produced in response to internal influence, indicating...[29] is being passed by previous educational experiences internal educational experiences: "Yeah, we were asked to do this...to basically improve our skill in surveying, drawing, on paper, and just to practice our perspectives, our lines, using the tools correctly and overall getting an idea of how surveying works." Note also...[28] Produces and uses paper-based isometric plan sketches may be used to explain the characteristics of a spatial design speculation matter to him/herself or others (a dimensioned, hand-drawn with straight edge plan drawing).
Figure 6 – Memos resulting from the analysis of respondent 07’s transcript during axial coding (sample – see Appendices E and F for complete examples)

The results of the axial coding process are presented and discussed in chapter 8.0 Analysis and findings, however, a selection of categories and sub-categories produced is provided here to help the reader understand the methodological journey I was undertaking:

Category: [38] Evaluates his/her design process in an overview

Category: [29] Is being guided by internal educational experiences

Category [7] Appears to be using dismissive words and phrases to describe his/her design ideation tools
Sub-category: [6] Produces and uses paper-based freehand perspective sketches in response to a spatial design matter

Sub-category: [12] Produces and uses collage in response to a spatial design matter

Sub-Category: [33] Produces and uses paper-based freehand sketch diagrams to ask (and attempt to answer) questions about space planning concerning his/her design proposals

Overall, I identified between thirty and forty categories and sub-categories: the number fluctuated as I coded and recoded the data, and then reviewed and reflected on the outcomes, rejecting some categories and sub-categories as ill-judged, and merging those that appeared to be duplicates of each other. For example, as part of this process, I deleted an early sub-category, [35] Mentions having a positive experience through his/her design speculations, because I deemed that the positivity (or negativity) of the experience could more helpfully be seen as a dimension of the category IM-U [13] Mentions experiencing a design insight through his/her ideation activities (see below for a further discussion on dimensions). As another example, I decided to merge an early sub-category, [21] Produces and uses paper-based freehand plan sketches to explain the characteristics of a spatial design speculation to him/herself or others, with [31] Produces and uses paper-based freehand plan sketches to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation, forming [31] Produces and uses paper-based freehand plan sketches in response to a spatial design matter. I did this because, following a period of reflexivity, I determined that it was not possible reliably and consistently to identify whether a respondent was making an ideational move to explain the characteristics of a spatial design speculation to the him/herself or others, or to ask (and attempt to answer) questions. Thus, I deemed that this distinction was unhelpful.

As well as merging and deleting categories and sub-categories, I also refined them. For example, early on during axial coding, I defined the sub-category [33] Produces and uses paper-based freehand sketch diagrams to ask (and attempt to answer) questions about space planning concerning his/her design proposals. After a period of reflexivity, I found this to be
questionable because, as has already been discussed regarding a different sub-category, it specified asking (and attempting to answer) questions as distinct from the respondent explaining to him/herself or others, and I regarded this as difficult to evidence. Thus, the sub-category became amended to [33] Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter. I also refined the dimensions over the course of time. For example, to begin with, the dimensions of the sub-category [33] Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter comprised When, How Much/Often, Connectedness, Understanding, confidence and independence and Size of design move. Having reviewed the data, and the categories and sub-categories, I determined that several of these dimensions were inappropriate. When and How Much/Often I regarded as problematic because, whilst determining when and how much/often something happened during the interview was simple enough, determining when and how much/often it happened during the project was much more uncertain. Understanding, confidence and independence I regarded as very difficult to gauge because a student may seem confident whilst not feeling so: a highly detailed paper-based freehand sketch may appear to evidence confidence but so, too, may a very rudimentary one; and an apparently bold design move may indicate confidence, desperation, a calculated move, a reckless one, or something else. Size of design move I regarded as too subjective because a design move that I judged to be small may have seemed large to the respondent, or vice versa, and size may not be a measure of importance within the ideation process. Thus, I chose dimensions that I regarded as measurable, and which I believed would provide helpful insights: What and Connectedness.

Each allocation of each category and sub-category I tabulated and enumerated in what became a three-hundred-and-two-page table, sampled in table 5.
Table 5 – Excerpt from the table of axial coding categories and sub-categories (sample – see Appendix G for a larger sample)

<table>
<thead>
<tr>
<th>Respondent 01 (Level 4)</th>
<th>DONE AND REVIEWED FINAL DIAGRAMS PRODUCED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sub-Category:</strong></td>
<td>[4] Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter</td>
</tr>
<tr>
<td><strong>Dimensions:</strong></td>
<td>When – immediately at the start of the project How much/briefly What – 11-12 sketches, showing variation of a staggered, almost herringbone pattern of lines, maybe plans, maybe elevations, maybe the respondent is not sure yet Connectedness – produces text and uses these diagrams in conjunction with 1 page of handwritten text including Eisenman quotes that it is ‘not to conquer pure function’...</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Respondent 07 (Level 4)</th>
<th>DONE AND REVIEWED FINAL DIAGRAMS PRODUCED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sub-Category:</strong></td>
<td>[6] Produces and uses paper-based freehand sketch sketches to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter</td>
</tr>
<tr>
<td><strong>Dimensions:</strong></td>
<td>When – close to the very start of the project How much/briefly What – 1 long column of handwritten text: “If we design a living space to promote family values, we create an area that harmonizes the integration of generations. The kitchen becomes the core living area within the domestic space. Where generations can interact in a productive way. A healthy lifestyle can be promoted while nurturing intergenerational educational relationships. While cooking food together, preparing food together. Some of the words are placed in boxes: ‘space’, ‘growing’, ‘eating’ etc. Connectedness – This is a summary of the concept that I took from a previous project – it was sort of kind of tinkered. It was really first pencil pair project and you just designed this concept rather than designing anything at all. The oven was using the kitchen as a core space of the house.”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Respondent 11 (Level 6)</th>
<th>DONE AND REVIEWED FINAL DIAGRAMS PRODUCED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sub-Category:</strong></td>
<td>[4] Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter</td>
</tr>
<tr>
<td><strong>Dimensions:</strong></td>
<td>When – immediately at the start of the project How much/briefly What – 10 long columns of handwritten text: “The top 2 sheets of 6 sheets turn of a small (55) lined notebook, which show paper-based freehand sketches (plus hand written text). The diagrams mostly show ways of arranging four or five activities/functions within a circular form, although some show arrangements of four corners, some with slim wedges. Most of the diagrams show two-dimensional images in rudimentary plans, but 2 show three-dimensional views; there is a cell with a slim wedge removed, outlined. Connectedness – produces text and uses these diagrams in conjunction with handwriting text: the activities/functions are sometimes marked by hand as “R”, “W”, “P”, and “S” (it isn’t clear what these mean), there is also “A”, “A”, “R”, “RR”, “R”, “add”, “rfr”, “reflection &amp; calculation”, “sliding”, “classroom spaces”, “bay window” and “classroom spaces”, “storage”, “classroom spaces”, “bay window”, “classroom spaces” and some I cannot read. Some of the additional text states “encourages new working atmosphere” and “range of environments throughout day”. Also used in conjunction with at least 3 other layers of text and paper-based freehand sketches. <strong>What cues are these that these axes are connected?</strong> Well, some of the text is written on the diagrams, some written very close to the diagrams, and some is linked to it by hand-drawn arrow lines. Also, because all the pages can be seen, at least in part, syntactically I wonder if it sees each as connected to the others.”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Respondent 13 (Level 6)</th>
<th>DONE AND REVIEWED FINAL DIAGRAMS PRODUCED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sub-Category:</strong></td>
<td>[6] Produces and uses paper-based freehand sketch sketches to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter</td>
</tr>
<tr>
<td><strong>Dimensions:</strong></td>
<td>When – close to the very start of the project How much/briefly What – 1 long column of handwritten text: “If we design a living space to promote family values, we create an area that harmonizes the integration of generations. The kitchen becomes the core living area within the domestic space. Where generations can interact in a productive way. A healthy lifestyle can be promoted while nurturing intergenerational educational relationships. While cooking food together, preparing food together. Some of the words are placed in boxes: ‘space’, ‘growing’, ‘eating’ etc. Connectedness – This is a summary of the concept that I took from a previous project – it was sort of kind of tinkered. It was really first pencil pair project and you just designed this concept rather than designing anything at all. The oven was using the kitchen as a core space of the house.”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Respondent 09 (Level 6)</th>
<th>DONE AND REVIEWED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sub-Category:</strong></td>
<td>[6] Produces and uses paper-based freehand sketch sketches to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter</td>
</tr>
<tr>
<td><strong>Dimensions:</strong></td>
<td>When – close to the very start of the project How much/briefly What – 1 long column of handwritten text: “If we design a living space to promote family values, we create an area that harmonizes the integration of generations. The kitchen becomes the core living area within the domestic space. Where generations can interact in a productive way. A healthy lifestyle can be promoted while nurturing intergenerational educational relationships. While cooking food together, preparing food together. Some of the words are placed in boxes: ‘space’, ‘growing’, ‘eating’ etc. Connectedness – This is a summary of the concept that I took from a previous project – it was sort of kind of tinkered. It was really first pencil pair project and you just designed this concept rather than designing anything at all. The oven was using the kitchen as a core space of the house.”</td>
</tr>
</tbody>
</table>
This presentation of the axial codes confronted me with significant challenges. Firstly, I encountered data overload once again, this time because, although there were fewer categories and sub-categories than there had been codes and sub-codes, I had allocated these many times, producing a table that could not be viewed synoptically nor remembered in detail. Secondly, the memos I produced as part of the axial coding were so extensive that I struggled to keep them clearly in mind (Strauss and Corbin, 1998). It is arguable that what I had encountered was:

‘...what John Lofland (1970) calls ‘analytic interruptus’ in qualitative research...A disjuncture arises between the analytic level in these grounded theory studies and the goal of theorising.’ (Charmaz, 2006, p. 139)

Thirdly, although traditional grounded theory aspires to integrate the concepts that have been devised into a central – or core – category (Strauss and Corbin, 1998), I found it difficult to do this. The central category should emerge from the research yet be a further abstraction from the original data, condensing all the analytical outcomes into a succinct, credible statement that explicates what the study was actually investigating (ibid.). I found that no such category was emerging. What was to be done?

Charmaz (2006) has questioned the effectiveness of axial coding as a tool for grounded theorising, suggesting that whilst it may enhance the analytic strength of the researcher’s developing ideas, it can also ‘...make grounded theory cumbersome...’ (Charmaz, 2006, p. 63) I found that axial coding had indeed helped to strengthen my developing ideas within the study (see chapter 8.0 Analysis and findings) and, after the frustrations of open and focused coding I regarded this as a major step forward. However, I also found that certain aspects of Strauss and Corbin’s (1998) advice did appear to make grounded theorising somewhat cumbersome. I thus sought a more effective approach within axial coding methodology.
4.14 Identifying a core category

To aid conceptual integration, Strauss and Corbin (1998) advise writing storylines, producing diagrams and revisiting and organising memos. I used all of these approaches in order to move towards the identification of a central category. To begin with, I reviewed all the memos I had written with the aim of identifying concepts that were more over-arching, and I produced a series of diagrams that attempted to show each category and sub-category, and their properties and dimensions, in a less discursive, more visual and more abstract way – see figure 7 for examples.
Figure 7 – Diagrams showing sub-categories, properties and dimensions in visual and more abstract way (examples – see Appendix H for further examples)

These steps I found to be of limited value because they appeared not to help the study to move significantly beyond the descriptive. Writing storylines, however, I found to be more
helpful. It is recommended that, when the analyst begins to consider how to integrate the various concepts identified, s/he will have been immersed in the data for a long time and have developed an instinctive sense of what was emerging, although struggle to express this clearly (ibid.). In such a situation, writing a succinct statement answering the following questions can help put him/her in a position to label this potential central idea and link other concepts to it:

‘What is the main issue or problem with which these people seem to be grappling? What keeps striking…[me] over and over?’ (Strauss and Corbin, 1998, p. 148)

My statement in answer to these questions, produced towards the end of axial coding, was as follows:

‘Do I have a ‘gut’ feeling of what this research is all about? Yes. So what’s my gut feeling?

Design ideation: it’s about how different students make a similar range of ideational moves apparently with similar understanding but with different levels of connectedness and confidence.’

My descriptive story was:

‘What keeps striking me about these interviews is that, although different students make a similar range of ideational moves apparently with similar understanding, they appear to make them with different degrees of connectivity and have different levels of confidence. What also strikes me is that connectivity and confidence appear to be linked closely: a ‘high score’ in one is always followed by a ‘high score’ in the other.’
I regarded this descriptive story as fitting much of the data together with categories and sub-categories devised, whilst also accounting for many of the dimensional ranges identified (Strauss and Corbin, 1998). I thought this a promising start, however, I also regarded it as insufficiently integrative: it did not address patterns of ideational moves made, the role of digital technologies in the respondents’ project work, nor the data concerned with discursive moves of which I was becoming aware. Following a period of reflexivity, I believed it was necessary to move away from Strauss and Corbin’s advice. This may seem contentious, but it should be remembered that, to the grounded theorist, the priority is to enhance understanding of the data; flexibility is essential here, because what is key is:

‘…capturing the dynamic flow of events and the complex nature of relationships that, in the end, make explanations of phenomena interesting, plausible, and complete…Our advice is to let it happen.’ (Strauss and Corbin, 1998, p. 129)

4.15 Constructivist grounded theory

The work of several authors has informed the use of constructivist grounded theory in this study: Charmaz (2006, 2000, 1995 and 1994); Cole et al, 2011; Mills et al (2006); McCann and Clark (2003a and 2003b); Nelson and Poulin (1997); Norton (1999); Stratton (1997). Within the context of research, constructivism argues that there is no such thing as an objective reality, and that instead that each individual constructs their own reality (Guba and Lincoln, 1989). Investigating multiple realities means understanding that what may be known, and the theories that may be developed, are positioned in specific contexts, points of view and events: one is not utilising entirely objective analytical methods nor functioning in a social void (Cole et al, 2011; Charmaz, 1995) but is, rather, living in, and being influenced by, the world and bringing to the study personal presumptions, concerns, prejudices, life experiences and goals. In addition to the immediate participants, a wide range of actors (including, in the case of this study, teaching associates, fellow research students, and academics from other institutions met during conferences) may affect the conduct of the study (Charmaz, 2006). This is known as a relativist ontological stance (Guba and Lincoln, 1994), which argues that meaning is constructed by the researcher and the participants (Hayes and Oppenheim, 1997;
Pidgeon and Henwood, 1997) (see chapter 4.0 Research methodology for a more detailed discussion on relativism). The researcher constructs the theory by interacting with the participants, noting understandings, observations, conjectures and other thoughts in memos (Charmaz, 2006) and accepting that these can themselves become data (Cohen et al, 2011) and thus part of the emerging theory. Because of this, the researcher should whilst reporting on the study provide information on matters such as the nature of the contact with the participants, the effect they had on him/her and how well or badly the interview progressed (Mills et al, 2006).

In order to carry out constructivist research it is necessary to be located as deeply as possible within the event being investigated whilst also accepting that it is not possible to know, think and feel as the participants do. It is important to maintain receptiveness to potential theories throughout, seeking to determine what the data reveal at every step. Fundamental to this approach is an interpretive, imaginative response accompanied by ‘[t]heoretical playfulness…Whimsy and wonder can lead…[the analyst] to see the novel in the mundane. Openness to the unexpected expands…[the] view of studied life and subsequently of theoretical possibilities.’ (Charmaz, 2006, p. 135-6) The development of grounded theory relies on the researcher’s thoughts, opinions, beliefs, speculations, feelings and so on and cannot occur independently of these, but it also needs to be supported by a detailed investigation of how the participants compose actions and create meanings (Charmaz, 2006). In this study, I argue that the careful analysis of interview content, broader context to each interview, lead-up to it, gatekeeper’s involvement and so on, comprise such a detailed investigation.

A constructivist approach does not set out to discover one fundamental process or category but presupposes that the world is complex, diverse and constantly changing, and explores how people’s acts impact on their world at micro- and macro-levels (Charmaz, 2006). Constructivist grounded theory can be indeterminate and provisional, connect the objective and subjective, and reveal patterns and links instead of straightforward causal relationships (ibid.). In general, it is not the pursuit of true data nor a means of verifying what was actually
happening in a particular setting (Glaser, 1998). In following up hunches and checking embryonic ideas the constructivist grounded theorist seeks credible explanations (ibid.), and this accords with my approach which has also sought credible explanations of the data that help increase understanding of what the respondents said and did.

The roots of constructivist grounded theory can be found in the work of Strauss (1987) and Strauss and Corbin (1990, 1994, 1998) in that these texts reveal the authors taking a relativist stance and propose that theory may be constructed by the researcher interpreting the participants’ narratives (Mills et al, 2006, p. 7). That said, the term constructivist grounded theory is first encountered in the work of Charmaz (2000), where the need for the researcher to maintain close contact during analysis with what the participants say is stressed. Mills et al (2006) state that articles concerning constructivist grounded theory are to be found within the disciplines of education (Jones, 2002; Jones and Hill, 2003), psychology (Corbet-Owen and Kruger, 2001; Dodson and Dickert, 2004; Madill et al, 2000; Stratton, 1997), occupational and environmental medicine (Gustafsson et al, 2003), and nursing (McCann and Clark, 2003a; Norton, 1999); and that each of these refers to the work of Charmaz (1995b, 2000) to support their argument for adopting a constructivist approach in their own studies. Indeed, Charmaz is regarded as constructivist grounded theory’s chief protagonist.

4.16 What constitutes theory?

In this study I have sought to develop a theory of how a sample of undergraduate spatial design students approached ideation during design project work as documented in their sketchbook material, and of how these students presented their sketchbook material in an interview setting. I have also considered how this theory may impact on undergraduate spatial design education, current expectations of what sketchbook material should comprise in an academic setting, and the formative and summative assessment of undergraduate spatial design ideational activity.

I have had access to a considerable amount of authoritative advice on how to carry out traditional grounded theory (see discussions above). This includes the recommendation to
investigate a process because that can help the researcher to understand how experiences and events inter-relate, identify the important stages, and focus on how these stages inter-relate. A process may be more easily viewed if the researcher investigates one that is recognizable – for example, that of joining a profession – because this may have clear start- and end-points and an easily-identified timeline in between. It is arguable that my research into design ideation demonstrates these characteristics: design ideation is a process, and, in an academic setting, it may be regarded as following a path with an identifiable timeline (Charmaz, 2006).

The researcher is also advised to avoid the thematic coding of the data during grounded theorising, and instead to code actions (ibid.). Gerunds – verbs which function as nouns (Cambridge University Press, 2008) – can be a powerful tool here because they encourage the researcher to consider what is active rather than inert, and that enables arrangements to be identified and associations made (ibid.).

Theory is not description. Description in this context involves using words to convey the likenesses of things, occurrences, ideas, feelings and so on, but theory is far more ‘…abstract and explanatory.’ (Charmaz, 2006, p. 127) In my study, I am not concerned with developing theory that forms a series of carefully developed concepts, linked by means of relational statements, that can explicate and forecast events and experiences (Strauss and Corbin, 1998), because this is too positivist a position. I find Alasuutari’s definition more helpful because, to me, theories offer frameworks that can be used to interpret the world (Charmaz, 2006, citing Alasuutari, 1996). I am seeking to devise such an interpretive framework and use it to make sense of the data, the wider reading, the input of the supervisory team, and my thoughts and feelings (Charmaz, 2006).

To me, constructivist grounded theory offers a good fit with ANT (see chapter 3.0 Conceptualisation) because both concern constructed multiple realities (Law, 2007) and accept that the researcher is part of the data (Charmaz, 2007).
5.0 Reflective and reflexive practice

5.1 Preamble

During this study extensive use has been made of deep introspection to explore, variously:

- where and by what means I was part of the data and influenced the construction of knowledge
- how to tackle the research workload, respond to feedback from supervisors, cope with periods of fatigue and stress, and clear mental blockages

I understand this work as comprising both reflexive and reflective practice. Appendix N contains examples of my reflective practice, and Appendices E and F examples of reflexive practice.

5.2 Reflective practice

Within this study the word ‘reflection’ is used to denote contemplation on the self and on practice, including both in and on action (Schön, 1995). In devising a suitable reflective approach for this study I considered several models of practice, each describing a cyclical process (Anonymous, 2017). Perhaps the simplest, Boud’s triangle, consists of three components – experience, reflection and learning – and proposes that reflection on experience leads to learning, and the application of learning becomes experience on which to reflect – see figure 8.
To me, this model appears somewhat simplistic. A more detailed model and, in my view, more helpful, is Gibbs’ Reflective Cycle – see figure 9.

This includes the reflection on feelings and does not distinguish between learning and experience. However, I suspect that the model does not make sufficiently explicit that learning
will bring about change (for example, to ways of thinking or working practices) so there is a risk that the reflections will be superficial. Atkins and Murphy’s model (ibid.) arguably addresses these concerns – see figure 10.

![Atkins and Murphy's model](image)

**Figure 10 – Atkins and Murphy’s model (ibid.)**

To me, the inclusion of discomfort and the need to analyse feeling and knowledge in this model are important within a research setting: something may feel wrong, or right, but it may take time to become aware of this and identify its causes. Also, I believe that this model, as it includes greater detail and makes the lines of enquiry more explicit, encourages deeper reflection.

Throughout this study, Atkins and Murphy’s model (ibid.) has informed my reflections on a range of personal pragmatic and emotional matters – for example, how to address data overload, tackle mental blockages and instances of low morale, make time for research and writing within the week, and approach the production of diagrams. As a committed reflective

5.3 Reflexive practice

Within this study ‘reflexive practice’ is taken to involve ‘…introspection. A deep inward gaze…’ (Ryan, 2005, p. 2) carried out as research events and activities take place. Thus, reflexivity ‘…entails the ability and willingness of researchers to acknowledge and take account of the many ways they themselves influence research findings and thus what comes to be accepted as knowledge.’ (Sandelowsky and Barroso, 2002, p. 222) In short, ‘…systematic reflexivity is the constant analysis of one’s own theoretical and methodological presuppositions…’ (Coughlan and Brannick, 2005, p. 6) Analysing empirical data requires the use of interpretive methods (Alvesson and Sköldberg, 2009). That said, interpretation does not occur in a vacuum, nor is the interpreter purely objective and uninfluenced by surroundings (Cole et al, 2011; Mauthner and Doucet, 2003). Thus, presumptions about the primary data, broader research context, underpinning literature, emerging theories and the means of communication of the research findings need to be understood with clarity, and the analytical focus needs to be directed not only towards the primary data per se but also internally towards myself and externally towards a range of external factors including the various traditions that might impact on the process of knowledge production and the role of language in conveying meaning (ibid.). It will be understood from this that reflexive practice needs to occur on a variety of levels which, altogether, constitute ‘the interpretation of interpretation’ (Alvesson and Sköldberg, 2009, p. 9) and consider ‘…the perceptual, cognitive, theoretical, linguistic, (inter)textual, political and cultural circumstances that form the background to – as well as impregnate – the interpretations.’ (ibid.) Reflexive practice requires the researcher to be aware of and critical of ‘pre-understandings’ (Cole et al, 2011, p. 143), and question ‘…natural and taken-for-granted attitudes, such as…prejudice, bias, thought and habits…’ (Cole et al, 2011, p. 144)
Alvesson et al (2008) describe four kinds of conceptual activity related to reflexivity: multi-perspective, multi-voicing, positioning and destabilising. These are associated with two kinds of reflexive practice: D-reflexivity, which aims to strengthen ‘reflexive rigour’ (Alvesson and Sköldberg, 2009, p. 312) and R-reflexivity, which aims to lead to ‘new insights.’ (ibid.) The former seeks to help the researcher to avoid problems within the study; the latter to foster creative thinking. The boundary between these is neither clear nor fixed (Alvesson and Sköldberg, 2009). It is likely that both will be found in a qualitative research project and it is the case that both were implemented within this study in order to investigate and evaluate the research methodology, the data and how they may be viewed, and possible emerging theories (Charmaz, 2006). For example, D-reflexive practice was used to gain understanding of my personal assumptions and to address their impact on the study, recognising that developing awareness could impact on the substance of subsequent theorising activity (ibid.). This study’s translation from ‘evolved’ grounded theory to constructivist grounded theory was an outcome of D-reflexive practice. R-reflexive practice, meanwhile, has been used to understand and interpret what the respondents said, showed and did during the video-recordings of the interviews. An example of this is the application of imaginative and playful reflexivity as discussed in section 4.15 Constructivist grounded theory (ibid.). For me, this included attempting to minimise concerns about whether the questions asked concerning the data and analysis were the ‘wrong’ questions, might lead to the ‘wrong’ answers or even call into question the reasons for carrying out the study. It also meant being sensitive to hunches fleetingly glimpsed, and following them up even if they seemed improbable or even ridiculous. Three examples of R-reflexive activity are shown in figures 11, 12 and 13.
In this example, the highlighted text shows me speculating on the need to look critically at the respondents’ design proposals per se. Such a course of action seemed inappropriate — this study was never meant to include the evaluation of the quality of the respondents’ creative output — but it was taken even though it was deemed, to repeat the word used above, ‘wrong’,...
in case it led somewhere worthwhile.

So, as with respondents 01 and 07, respondents 11 and 13 seemed to evidence a [29][38] unprompted page-turn connection, and respondent 03 seems to evidence a [3] unprompted page-turn connection, but respondent 05 does not share these characteristics. What might this mean? Perhaps this view of the data suggests that, apart from respondent 05, there was a certain loose similarity between the way the other respondents accounted for the work in their sketchbooks, contextualised that work, and navigated through the interview. And then, respondent 05 ‘breaks the mould’...? Perhaps respondent 05, more than any other respondent, demonstrated the use of ‘tokens’; items of work tabled, but not discussed in great detail (or at all where [71] occurs frequently, as it does in respondent 11’s and respondent 05’s interviews). Perhaps respondent 05 was so disorganised, forgetful or evasive, or something else, that she simply ended up ‘breaking the mould’ by talking too much – but not about the work she was showing – and showing too little. Perhaps...?

What might all this indicate? Let’s play...

If one considers the ‘green’ category, in comparison with all the other respondents, it appears from the second diagram that respondent 05 acted as a very directive guide during the journey through her sketchbook and, indeed, her interview. She appears to have turned pages without having been prompted 66 times, pointed to items on the page without having been prompted 16 times, mentioned on 21 occasions that her sketchbook was not complete, revealed work without explaining and/or discussing it 15 times, explained and/or discussed work without showcasing it 19 times, and appeared not to answer the question that was asked 9 times. Regarding the page-turning, it should not be assumed that I was passive during this interview. Indeed, I prompted the turn of the page 37 times. This data should be considered with another point in mind: when asked by me to show certain items of work respondent 05 tabled other work; on occasions she tabled work saying that she could not remember what it was or why she had produced it; on other occasions she seemed to be surprised to see the work she was taking. Towards the end of the interview, I became frustrated because I was expecting to see examples of paper-based freehand sketches and the respondent seemed unable, or even unwilling, to show me many of these. During the interview I could actually see examples of based freehand sketches on the table, but seemed unable to steer the respondent towards discussing them. In the latter stages of the interview, respondent 05 began to reveal one based freehand sketch after another relatively swiftly, saying relatively little about them, having appeared surprised to find them in her portfolio. It seemed to me on watching the video-recording that respondent 05 was being evasive, steering discussion away from her sketches and trying to communicate that she was a good designer without showing me evidence to support this. Perhaps she had decided that she might benefit from attending the interview by getting in my “good books” (maybe?) but found she had nothing to show me, or nothing she wanted to show me?

Figure 12 – Example of memo produced during axial coding (see Appendices E and F for further examples)

In this example, the highlighted text shows me speculating on whether respondent 05 had been behaving evasively during the interview. To me, this was a somewhat shocking thought – if respondent 05 was choosing to conceal ideational work, that might make the video-recording of the interview invalid (thus reducing the amount of primary data available for analysis). However, I carried out the speculation anyway, to see if it led somewhere worthwhile.
In this example, the highlighted text shows me speculating on what the data ‘might’ indicate – for example, that respondents 11 and 05 wanted to demonstrate that they were evaluative practitioners whether or not they were; that I unintentionally prompted some of the respondents to reflect on their practice but not others; or that I misinterpreted the data from the video-recordings of the interviews and over- or under-estimated the number of times respondents reflected on their practice. To me, these were somewhat troubling speculations because they prompted challenging questions: what if the respondent was trying to deceive, I was influencing the data in ways not understood clearly, or I was simply wrong? However, I asked these questions out anyway, to see if they led somewhere worthwhile.
6.0 Collecting and analysing the data

6.1 Preamble

Grounded theory data may be gathered from a range of sources, including documents, records, observations and films (Strauss and Corbin, 1998); textual analysis and ethnography (Charmaz, 2006); and interviews (Strauss and Corbin, 1998; Charmaz, 2006; Denscombe, 2010). As explained in section 6.3.2 Primary data sources, I chose to conduct focused interviews, guided by the research challenge (Charmaz, 2006).

Qualitative researchers have a considerable advantage compared to quantitative researchers because they can make changes to the data collection and analysis as the study progresses (ibid.). This flexibility is important because the trajectory of the study may alter over time so it is necessary to assess how the incoming data matches the original research focus; qualitative research is about exploring flexibly the possibilities that are identified within the data (ibid.).

Grounded theory data does not have to be numerous and wide-ranging in order to elucidate the properties and connectedness of the categories (Glaser, 1998; Stern, 1994). Charmaz (2006) lists a number of questions the researcher can seek to answer in order to ascertain whether enough data has been collected, including ‘…‘Have I gained detailed descriptions of a range of participants’ views and actions?’ ‘Do the data reveal what lies beneath the surface?’ ‘Are the data sufficient to reveal changes over time?’ [and] ‘Have I gained multiple views of the participants’ range of actions?’…’ (see Charmaz, 2006, p. 18-19 for the complete list).

Data may be constructed in a number of ways:

‘Attending to actions and processes as well as to words…Delineating the context, scenes, and situations of action carefully…Recording who did what, when it occurred, why it happened…and how it occurred…Identifying the conditions under which specific actions, intentions, and processes emerge or are muted…Looking for ways to interpret
these data...Focusing on specific words and phrases to which participants seem to attribute particular meaning...[and] Finding taken-for-granted and hidden assumptions of various participants; showing how they are revealed through and affect actions.’ (Charmaz, 2006, pp. 20-21)

All of the above apply to this study.

6.2 Obtaining primary data

Approaches to qualitative research are divided into research design and research techniques (Oppenheim, 1992). Research design is the essential research plan/strategy, and its underpinning logic. This explains how the sample will be defined and obtained and what components will be evaluated. Research techniques concern what approaches are implemented to obtain and analyse data, and why are they suitable, usable and trustworthy (ibid.).

6.3 Research design

6.3.1 Defining the sample

The focus of this study is to explore approaches to ideation by UK-based spatial design undergraduates. As discussed in chapter 4.0 Research methodology, I have not sought during either the pilot or main studies to procure a sample that represents the UK undergraduate spatial design population. It would have been necessary for such a sample to comprise a large number and wide variety of spatial design undergraduates from a large number and wide variety of institutions, and I do not regard it as feasible for a solo part-time researcher to attempt to collect and analyse such a huge quantity of data. However, I argue that the sample selected has offered depth by including students from undergraduate levels 4 to 6 (years 1 to 3) inclusive, so that investigation could be carried out into whether approaches to design ideation changed as undergraduates progressed through their studies, and, if so, how they changed. The sample has offered breadth. My experience of spatial
design students’ use of ideational moves, and the questions that this prompted, had resulted chiefly from my work as an interior architecture and interior design tutor at a widening participation institution where most of the undergraduates had comparatively low entry qualifications and, on commencing their studies lacked the attributes and skills that enabled them to work hard consistently and with confidence. I therefore regarded it as appropriate to draw the pilot sample from students on those courses at that institution. However, my investigations were not limited to my own institution (students from elsewhere may reveal things that those my own institution did not, perhaps because their syllabuses placed different emphasis on design ideation and involved different teaching and assessment methods); only to interior architecture and interior design undergraduates (students from other spatial design courses may reveal things that these did not, for similar reasons); or only to widening participation institutions (students from universities with higher and different entry qualifications, and which had different academic and career expectations, may approach design ideation in different ways). As a self-funded practitioner, I was compelled to restrict the sample to UK-based institutions within commuting distance of Luton because limited time and finances precluded travel over longer distances. These considerations led to the pilot study sample being defined as comprising undergraduate spatial design students from my own institution; and the main study sample as comprising spatial design students from an established former polytechnic that accepts applicants with higher entry levels than was at the time the case at my own institution, plus a top-ranking design institution. I proposed to interview at least two pilot study students from levels 4-6 inclusive, and at least one student from levels 4-6 inclusive at each main study site (having clarified the research questions during the pilot study I deemed it acceptable to use a smaller sample during the main study). The institution’s entry qualifications, as shown on The Guardian League Tables 2013, were used to determine whether it was suitable for this study. This test may seem crude but I regarded it as acceptable as a means of creating a long-list of institutions because it told me where to find:

- students with comparatively high A-level or equivalent grades (termed ‘high-ranking design institutions’ in this thesis)
and:

- students with lower A-level or equivalent grades than the high-ranking design institution, but higher than my own widening participation institution (termed ‘more established former polytechnics’ in this thesis)

From this long-list a short-list was produced based on the travel distance from Luton being commutable. What was then important was that the institutions were willing to allow access to the spatial design undergraduates for research purposes.

The overall sample was considerably smaller than those in Schenk’s (1989) and Jonson’s (2004) investigations into design sketching, but I regard it as viable for the reasons given above: it offered depth by including students from undergraduate levels 4 to 6 inclusive, and breadth by including a widening participation institution, a former polytechnic and a high-ranking design institution.

6.3.2 Primary data sources

I identified the key data sources as comprising the following, as contained in video-recordings and transcripts of focused interviews carried out during Term 2 of the academic year (occurring between the Christmas and Easter breaks) between myself and undergraduate spatial design students sampled from different institutions and year groups:

- Spoken accounts, during, in which the moves made in support of ideation work on a selected design project are discussed using an interview schedule.
- Documentation tabled by the students. This may be loose, contained in one or more sketchbooks, and/or on a laptop, but is generally referred to in this thesis as sketchbook material.
- Other interactions between the respondents and myself (such as page-turning,
pointing, and laughing).

See section 6.8 Transcribing the video-recordings for the approach to the production of the transcripts.

6.4 Research techniques

6.4.1 Primary data collection

Jonson (2004) reviews a range of approaches to primary data collection that may assist the investigation of design processes and, more particularly, the use of paper-based freehand sketches. Of these, interviews were chosen because of their association with ‘[t]he grounded theory approach…’ (Denscombe, 2010, p. 283). I regard interviews as an extremely effective means of obtaining data on the students’ sketchbook material, accounts of the creation of that material, and interaction with that material as they account for it. Furthermore, I had prior experience of using this means of primary data collection and regarded it as providing a solo part-time researcher possessing limited funds and time with a flexible and affordable means of procuring data. Jonson lists three different kinds of interview:

- open-ended interviews – with no pre-prepared questions
- structured interviews – following a predetermined sequence of questions
- focused interviews – informed by important themes but lacking a set sequence of questions (Jonson, 2004, citing Robson, 2016); (Charmaz (2006) refers to these as intensive interviews but for the sake of consistency and clarity I will use the term focused interviews in this thesis)

Grounded theorising requires the researcher to undertake, in effect, a journey into the unknown but does not necessarily require beginning with a completely open mind. Thus, whilst Denscombe (2010) states that grounded theory is more likely to emerge from unprocessed data obtained from unstructured interviews, and Glaser (1998) advises against using a schedule of interview questions, Charmaz (2006) argues that grounded theory may
result from a spectrum of approaches ranging from the lightly steered investigation of themes to the use of focused questions. Structuring the approach to the interview can be helpful if the questions enable the topic to be investigated freely, and could help the researcher to avoid asking something inappropriate by mistake. Accordingly, I designed the interview questions to encourage wide-ranging, open and unexpected responses, and to overlap so that the same areas could be addressed more than once. It was expected that not all of these questions would be used during a given interview (ibid).

A typical interview may be regarded as ‘…a directed conversation…’ (Lofland et al, 2006), but it does not follow conversational rules: the interviewer’s role is to be attentive and thoughtful, and to encourage the respondent to do the ‘lion’s share’ of the talking (Charmaz, 2006). The intention is not to cross-examine but to investigate. The questions should relate to the area of research and match the respondent’s experience, and should endeavour to:

- ‘Go beneath the surface of the described experience(s)
- Stop to explore a statement or topic
- Request more detail or explanation
- Ask about the participant’s thoughts, feelings, and actions
- Keep the participant on the subject
- Come back to an earlier point
- Restate the participant's point to check for accuracy
- Slow or quicken the pace
- Shift the immediate topic
- Validate the participant's humanity, perspective, or action
- Use observational and social skills to further the discussion
- Respect the participant and express appreciation for participating.’ (Charmaz, 2006, p. 26)

The respondent, meanwhile, can:
‘Break silences and express their views
Tell their stories and to give them a coherent frame
Reflect on earlier events
Be experts
Choose what to tell and how to tell it
Share significant experiences and teach the interviewer how to interpret them
Express thoughts and feelings disallowed in other relationships and settings
Receive affirmation and understanding’ (Charmaz, 2006, p. 27)

Interviews may present the researcher with certain challenges. All participants bring to the event ‘...subjective, [sic] interpretations of their social and professional world and place in it.’ (Cole et al, 2011) Some may feel tempted to say what they suspect the researcher wants to hear, and/or to post-justify their actions (Jonson, 2004, citing Lawson, 1990). Answers to questions may be unduly positive, and the use of words to describe unspoken design activity may be problematic (Jonson, 2004). Differences in ethnicity, social class, sex, maturity, beliefs, power and status may impact unhelpfully on what occurs within the interview (Charmaz, 2006). Some participants may possess unreliable memories, rethink and/or misinterpret ideational work they carried out (Jonson, 2004). Also, participants in this study in particular may have felt inhibited by being video-recorded (see below). I was mindful of these hazards throughout the interviews, but believed that that process was valid because it could allow the respondent to disclose the thinking behind the ideational moves used (Jonson, 2004, citing Seale, 1998) and myself to note what was being spoken of, request explanations where needed, and make tactful, non-directive intercessions (Jonson, 2004, citing Flick, 1998). These characteristics seemed to offer the potential to access rich qualitative data – both verbal and non-verbal – and that potential prompted me to choose focused interviews as the key means of obtaining primary data.

Notwithstanding this, in order to answer the study research questions (see chapter 1.0 Introduction) I believed that the basic focused interviews required certain enhancements: they needed to include sketchbook material which had to be discussed during the interview,
and they needed to be video-recorded so that there was a record of this non-verbal content. These enhancements made this methodology customised rather than ‘ready-made’ (Jonson, 2004, p. 132) but offered certain benefits. For example, I was aware that respondents might provide erroneous and/or incomplete data because of poor recollection (Jonson, 2004), and hoped that the sketchbook would reduce this risk by acting as a memory-jogger. Also, I was aware that interviews may rely too heavily on verbalisation of the design process and therefore fail to capture non-verbal thought processes (ibid.), and hoped that the sketchbook would go some way to obviate that. Bilda et al. state that the majority of empirical studies of ‘design problem solving’ (Bilda et al, 2006, p. 2) focus on the oral content, occasionally combined with the examination of the drawn content (Akin, 1986; Cross et al, 1996; Schön, 1995). They also video-recorded interviews they carried out (Bilda et al, 2006). Their combination of spoken and drawn content, and video-recordings, as sources of data leading to viable research outcomes suggests that my enhancements were on a sound footing.

To summarise, I chose to conduct focused interviews because they were particularly appropriate to the objectives of the study (Charmaz, 2006). I acknowledge that the interviewer plays a directorial role but this is acceptable in grounded theorising because it is necessary for the researcher to lead the collection and analysis of the data (ibid.). I sought to reduce the number of variables to a minimum in order to avoid inappropriate comparisons being made across the data sample – for example between data from, say, undergraduate and postgraduate students or students of architecture and engineering product design (it is contended that both of these could lead to interesting outcomes but they would not be relevant to this study). Thus, all interviews were carried out: by myself with UK-based spatial design undergraduates, one-to-one, as they discussed sketchbook material they had produced during assessed design project work; within the respondent’s educational institution; and using the same interview schedule. Also, all interviews were documented by means of a video-recording which was then transcribed; and all video-recordings and transcriptions were analysed using the same methods. It is arguable that the variables could have been reduced further if I had selected only students of architecture, interior architecture or interior design, but, as has been stated above it is my contention that these three programmes all concern
spatial design and their undergraduates may all be expected to use the same ideational tools.

6.5 Research ethics

Consent from the University of Bedfordshire’s Research Ethics Committee for this study was secured prior to commencement of the pilot study in 2012, and main study in 2014. Regarding the main study, this involved submitting the documentation for consideration shown in figure 14 (the pilot study documentation is shown in Appendix A).
UNIVERSITY OF BEDFORDSHIRE

Research Bid: Ethical Issues (Annex to RS1 form)

Section A must be completed by the proposer and the form should then be submitted with a copy of the research proposal to the Director of the Research Institute

Proposer: Garry Layden

Research Institute: IRED

Proposal short title: An investigation into undergraduate spatial design students’ approaches to design ideation

SECTION A To be completed by the candidate

The candidate is required to summarise in the box below the ethical issues involved in the research proposal and how they will be addressed. In any proposal involving human participants the following should be provided:

- clear explanation of how informed consent will be obtained,
- how will confidentiality and anonymity be observed,
- how will the nature of the research, its purpose and the means of dissemination of the outcomes be communicated to participants,
- how personal data will be stored and secured,
- if participants are being placed under any form of stress (physical or mental) identify what steps are being taken to minimise risk

If protocols are being used that have already received UREC ethical approval then please specify. Roles of any collaborating institutions should be clearly identified. Reference should be made to the appropriate professional body code of practice.

Answer the following question by ringing/deleting yes or no as appropriate:

1. Does the study involve vulnerable participants or those unable to give informed consent (e.g. children, people with learning disabilities, your own students)?

Yes No

2. Will the study require permission of a gatekeeper for access to participants (e.g. schools, self-help groups, residential homes)?

Yes No

3. Will it be necessary for participants to be involved without consent (e.g. covert observation in non-public places)?

Yes No

4. Will the study involve sensitive topics (e.g. sexual activity, substance abuse)?

Yes No

5. Will blood or tissue samples be taken from participants?

Yes No

6. Will the research involve intrusive interventions (e.g. drugs, hypnosis, physical exercise)?

Yes No
7. Will financial or other inducements be offered to participants (except reasonable expenses)?

   Yes  No

8. Will the research investigate any aspect of illegal activity?

   Yes  No

9. Will participants be stressed beyond what is normal for them?

   Yes  No

10. Will the study involve participants from the NHS (e.g. patients or staff)?

    Yes  No

If you have answered yes to any of the above questions or if you consider that there are other significant ethical issues then details should be included in your summary above. If you have answered yes to Question 1 then a clear justification for the importance of the research must be provided.

*Please note if the answer to Question 10 is yes then the proposal should be submitted through NHS research ethics approval procedures to the appropriate COREC. The University Research Ethics Committee should be informed of the outcome.

2. Will the study require permission of a gatekeeper for access to participants (e.g. schools, self-help groups, residential homes)?

   As part of my Main Study, I intend during 2014 to carry out focused interviews, preferably video-taped, with certain students and academics from certain other institutions. I intend to seek gatekeeper permission for these activities as follows:

   a. Introducing my research project clearly, openly and in writing to the relevant representatives of these institutions’ research ethics committees.

   b. Explaining clearly, openly and in writing to the relevant representatives of these institutions’ research ethics committees that either their participation or their non-participation (as applicable) would be without prejudice; that either their participation or their non-participation (as applicable) would be anonymous as much as I would store all interview data in password-protected files, I would identify all video-tapes and transcripts using reference numbers that are stored separately in password-protected files, I would destroy all interview data personally upon either my successful completion of the Professional Doctorate or my abandonment of the research programme having failed to complete successfully (ie: no later than 2015), and I would not identify the source of any data in any public forums, that all responses would be of interest to me because I am not aiming to criticise the students, the course, the tutors, the division/departmen/school, or the institution but simply to find out more about the field of enquiry – there are thus no ‘acceptable’ or ‘unacceptable’ answers to the questions.

   c. Explaining to the relevant representatives of these institutions’ research ethics committees that their students and/or academics will be able to withdraw from participating in this research programme, without prejudice, at any time up to the end of data collection.

   d. Explaining to the relevant representatives of these institutions’ research ethics committees that my published work concerning this research programme will not reveal details of actual institutions investigated, so the institution and/or its members would not be ‘put in a bad light’ by any data that third parties might regard as indicating performance or achievement deserving of criticism or concern.

Checklist of documents which should be included:

   - Project proposal (with details of methodology) & source of funding – see above
   - Documentation seeking informed consent (if appropriate) – see below
   - Information sheet for participants (if appropriate) – see below
   - Questionnaire (if appropriate) – N/A

Signature of proposer:  
Date: 07/01/14

This form together with a copy of the proposal should now be submitted to your Research Institute Director.
University of Bedfordshire
Institute for Research in Education (iRed)

CONSENT INFORMATION

Title of Project: An investigation into undergraduate spatial design students’ approaches to design ideation

Who am I?
I am Garry Layden, a part-time research student at the University of Bedfordshire, studying for a Professional Doctorate in Education. My contact details are: Garry Layden, School of Art and Design, The University of Bedfordshire, Park Square, Luton LU1 3UU, email: garry.layden@beds.ac.uk. I am also a registered architect and I run the School of Art and Design’s Spatial Design Cluster (including the BA (Hons) Interior Architecture and BA (Hons) Interior Design).

What am I trying to do and why?
Many spatial design practitioners regard the production and use of paper-based freehand sketches during the design ideation stages of a typical project as important – even essential – in order to understand the challenges thoroughly and explore possible solutions imaginatively, swiftly and comprehensively. However, spatial design undergraduates’ engagement with this process appears to be declining. Research into this field has been carried out, but I believe there is a need to investigate further in order to understand more fully what design ideation tools spatial design undergraduates are using, why they are using them, and how students from a range of academic levels at a variety of institutions compare. I aim to do this by holding focused interviews with a range of spatial design undergraduates during which I ask them to ‘think aloud’ as they take me through their sketchbooks/journals/preliminary work page-by-page, explaining what they did, what they were trying to do, why they chose these approaches, how effective (or otherwise) they thought the approaches were, what (if anything) they would choose to do differently next time, and why they would make those choices. I intend that the interviewees will come from a widening participation University, a more established ‘new University’, and a high-ranking University-sector College of Design. My aim is to interview between one and three students from Years 1, 2 and 3 (Levels 4, 5 and 6) respectively, plus between one and three academic/practitioners, at each institution. My research and my conclusions will be developed into a doctoral thesis and submitted for examination. If successful, this research could be showcased more widely and lead to a better understanding of the field of investigation.

What will my research involve?
My research relates to my own academic practice. Informed by this, I have identified you as possessing knowledge, skills, experiences, ideas and opinions that are of interest and value. You are being asked to take part in a one-to-one focused interview during which I will ask a number of open ended questions designed to help you to speak openly about design ideation during a typical project. I would like to hear your genuine views rather than what you think you ought to say or I want to hear. Whatever you tell me will be of interest because I am not aiming to criticise you, your course, your tutors, or your institution, but simply to find out more about the field of enquiry—there are thus no ‘acceptable’ or ‘unacceptable’ answers to my questions. Your interview should last 30-45 minutes, and you may withdraw your consent any time during it. I hope students will agree to my making a video-recording of the interview, and academic/practitioners will agree to my making an audio recording, which I will later arrange to be transcribed into text. The video will focus on your sketchbook, not on you.

Either your participation or your non-participation (as applicable) will be without prejudice and will also be anonymous inasmuch as I will store all interview data in password-protected files, I will identify all video and audio recordings and transcripts using reference numbers that are stored separately in password-protected files, I will destroy all interview data personally upon either my successful completion of the Professional Doctorate or my abandonment of the research programme having failed to complete successfully (ie: no later than 2015), and I will not identify the source of any data in any public forums. I will supply you with a copy of the video and audio recording and/or the transcript if you wish. You will be able to withdraw from participating in this research programme, without prejudice, at any time up to the end of data collection. Your contribution will only be used for the purposes of this project. If I think your contribution might be of use for other purposes, I will seek your explicit consent. I am very grateful for your time and willingness to help. All contributions will be treated with respect, and I hope you will find your interview worthwhile.

Garry Layden
University of Bedfordshire
Institute for Research in Education (IReD)

CONSENT FORM

Title of Project: An investigation into undergraduate spatial design students' approaches to design ideation

Researcher: Garry Layden, research student, garry.layden@beds.ac.uk

Please initial box

1. I confirm that I have read and understood the information sheet for the above study and have had the opportunity to ask questions.

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason.

3. I agree to take part in the above study.

Please tick box

4. I agree to the interview being video recorded.

5. I agree that my data gathered in this study may be securely stored until this research study is complete.

Name of Participant ___________________________ Date ___________ Signature ___________

Name of Researcher ___________________________ Date ___________ Signature ___________
University of Bedfordshire  
Institute for Research in Education (IReD)

INTERVIEW QUESTION AREAS

Title of Project: An investigation into undergraduate spatial design students’ approaches to design ideation

Researcher: Garry Layden, research student, garry.layden@beds.ac.uk

Introductory material [prior to recording]:

Please don’t mention anything that might help a third party to identify your name, or your tutors, or this course, or this institution. I will try to do the same.

During our interview, I’ll be referring to a schedule of questions that is written here. This is just to remind me of what I’d like to hear you talk about. I hope it won’t put you off. If you wish, you may have a copy.

Introductory material [whilst recording]:

Hello, thank you for making time for this interview today. Just for the record, how are you?

For the record, can you tell me what course you are on, and what year?

For the record, can you tell me what you have brought for this interview today: how many sketchbooks and from which year/s of your study?

For the record, can you please confirm that you have read the Consent Form and signed it? Can I remind you that you are free to end this interview at any time without explanation?

Are you comfortable? Are you ready to begin?

Main question areas [whilst recording]:

[At the first page] Before looking in detail at your sketchbook, can you summarise what you had been asked to do here? What was the project/workshop/task?

[Pointing to the first item on the page] So, was this the first thing you did?

What were you trying to do here?

Why did you choose this approach/technique first? Did you choose it independently, or did your tutor advise/direct you?

Did you plan your approach in advance (if so, for how long and in how much detail), or did you work more instinctively or organically? What made you take one or other of these?

How long did you spend on the approach/technique? Do you think that was long enough/too long/about right?

Was this work you carried out in the studio or in your own time?

Did you expect to discuss this approach/technique with anyone – tutor/s, student/s or anyone else? Did you discuss it with anyone – tutor/s, student/s or anyone else?

[Pointing to subsequent items] What did you do next?

[See questions above]

How did this connect with the previous approach/technique, if at all?
As this study required that adult spatial design undergraduates voluntarily discussed their ideational work with me in an interview setting, and as the respondents were informed that they were free to withdraw at any time without giving reason, and as access to the respondents was negotiated through their respective gatekeepers, I regarded the ethical issues as comparatively minor. I nonetheless accepted that the respondents may during their interviews present data that reflected badly on their academic institution or individuals within it. Thus, I determined that none would be named publically, none of the video-recordings
would allow them to be identified, and no main study institutions would be identifiable by any third parties (only by myself, the supervisory team, the Research Ethics Committee and the examiners).

6.6 Arranging the interviews

As was discussed in section 6.3.1 Defining the sample, I began this study intending to carry out interviews with spatial design undergraduates at three sites: my own university (within the pilot study), plus a former polytechnic and a top-ranking institution (within the main study). In early 2013, whilst completing the initial literature review, I began the process of organising the interviews. Initially, this comprised arranging to meet the spatial design students, numbering approximately forty-five undergraduates, then-current at the University of Bedfordshire in order to deliver a briefing on the study and recruit participants. Two different approaches were required here. The first concerned the level 5 students. As I was at that time their tutor, I incorporated the briefing into one of their scheduled design studio sessions. The second approach was used with the level 4 and 6 students. Before contacting them, I obtained approval from their respective tutors, whom I regarded as the gatekeepers. These people agreed to my carrying out the interviews, and, as far as is known, played no further role in the study. I then sent group e-mails to each cohort, inviting the students to attend briefing sessions in their design studios at what I believed were convenient times.

These approaches resulted in three briefing sessions approximately 30 minutes long, one for each year group, each introducing the study, explaining what I proposed and detailing the ethical considerations (see figure 14 for a copy of the briefing documentation concerning the main study, and Appendix A for a copy of the briefing documentation concerning the pilot study). I hoped that every current spatial design student at the University of Bedfordshire would attend, however, approximately twelve were missing. The session ended with my inviting the students to contact me by e-mail if they wished to participate, stressing that those who did not do so would not be penalised, and those who did would gain no special favours. Within two weeks, the following students, in chronological order, expressed a willingness to participate: one from level 4, two from level 5, two from level 6, and two more from level 4. I
contacted these by e-mail to arrange mutually agreeable interview times and venues. Apart from one of the level 4 students, all replied favourably. The following pilot study interviews took place over several days between January and April in 2013, in chronological order:

- Respondent 01 – level 4 interior architecture student – venue: break-out space next to spatial design studio (my choice)
- Respondent 02 – level 5 interior design student – venue: break-out space next to spatial design studio (my choice)
- Respondent 03 – level 5 interior architecture student – venue: break-out space next to spatial design studio (my choice)
- Respondent 04 – level 6 interior architecture student – venue: break-out space next to spatial design studio (my choice)
- Respondent 05 – level 6 interior design student – venue: group-study room away from the School of Art and Design (my choice)
- Respondent 06 – level 4 interior architecture student – venue: group-study room away from the School of Art and Design (my choice)

To procure the main study respondents, it was necessary for me to use different approaches. Having selected a suitable established former polytechnic and a top-ranking design institution, I located the gatekeepers, both of whom were course leaders, and introduced the study to them, explaining what was proposed (see figure 14 for a copy of the briefing documentation concerning the main study, and Appendix A for a copy of the briefing documentation concerning the pilot study) and detailing the ethical considerations (see section 6.5 Research ethics for details). I asked for permission to brief each year group in person on site, and to participate in the discussion on where the interviews would take place. The gatekeeper to the top-ranking design institution proposed a date and time for the visit, but it transpired that this would be in order to interview participants whom the gatekeeper had already procured; I was not invited to brief the year groups beforehand, nor to discuss where the interviews would take place. Accepting this arrangement, I visited the institution on one day in January 2014 not knowing how many students would be available for interviewing, nor
from which year group/s, nor where the interviews would take place. The gatekeeper introduced all the participants, offered advice on where to conduct the interviews, and left me to arrange exact appointment times. The following main study interviews took place, in chronological order:

- Respondent 07 – level 4 architecture student – venue: sitting area in library (gatekeeper’s choice)
- Respondent 08 – level 4 architecture student – venue: sitting area in library (gatekeeper’s choice)
- Respondent 09 – level 6 architecture student – venue: student’s work-station in shared studio space (student’s choice)
- Respondent 10 – level 5 architecture student – venue: student’s work-station in shared studio space (student’s choice)

The gatekeeper to the established former polytechnic was approached in a similar manner to the gatekeeper to the top-ranking design institution (outlined above). This person proposed a date and time for the visit, but it again transpired that this would be not to brief prospective participants but to interview participants whom the gatekeeper had procured. In this case, the gatekeeper revealed the names year and groups of the students (none from level 4). I was not invited to discuss where the interviews would take place, but was able to negotiate interview times. Accepting this arrangement, I visited the institution on one day in February 2014, to be met by respondent 12 who led the way to the interview venue. The following main study interviews took place, in chronological order:

- Respondent 11 – level 5 interior design student – venue: ‘hot desk’ work-station in shared studio space (gatekeeper’s choice)
- Respondent 12 – Level 5 interior design student – venue: ‘hot desk’ work-station in shared studio space (gatekeeper’s choice)
- Respondent 13 – Level 6 interior design student – venue: ‘hot desk’ work-station in shared studio space (gatekeeper’s choice)
Superficially, the approaches outlined above indicate a degree of homogeneity across the sample: thirteen spatial designers were interviewed by me, a spatial design academic, in higher educational establishments. Closer scrutiny reveals that the approaches were comparatively heterogeneous. Of the thirteen respondents, four were from level 4, five level 5, and four level 6; and four were studying interior architecture, five interior design (at two different institutions) and four architecture. How the respondents were briefed and selected varied across all three institutions, as did the behaviour of the gatekeepers, leading to uncertainty about why each respondent came to be interviewed:

- To what extent were they willing participants?
- Did the students from the University of Bedfordshire attend because they had something to say about ideation, because they perceived me as having power over them notwithstanding my assertions in the ethics proposal, because they felt some loyalty towards me, or for some other reason?
- Were the main study respondents handpicked by the gatekeeper, and had this person sought to impose his/her own agenda?

The venues and who chose them varied considerably. Four pilot study respondents were interviewed in teaching spaces chosen by me and with which the students were familiar, two in what may have been regarded as more-or-less neutral space within the university. The main study respondents were interviewed in spaces with which they were familiar but I was not, two of which were chosen by them and two by the gatekeeper. In addition, whilst all-but-two of the pilot study interviews took place on separate days that allowed me time to rest and reflect in-between, the seven main study interviews took place over two days.

The sketchbook material the respondents brought also differed markedly from one interview to another, as did the ways it was revealed, explained and discussed. Whilst there was again a superficial consistency – in all cases the sketchbook material consisted of spatial design development work – the format was not constant across all the interviews.
Finally, during the main study five interviews took place in environments that contained a considerable amount of background noise. During the pilot study the interview location was within my control, and certain possible refinements were tested including moving from the busy studio – which was on occasions distractingly noisy – to a quiet group study room. Reflections after the pilot study indicated that something had been lost in the transfer from an environment familiar to the respondent to an unfamiliar one. I argued that the main study respondents would feel more comfortable discussing their ideational work in the studio rather than in, say, a seminar room, group study room or office (which might allow more control of the environment but be less familiar to the respondent). Unfortunately, these studios were on occasions relatively busy and with fairly disruptive events taking place nearby.

Responding effectively to the heterogeneity summarised above required a highly reflexive approach to the analysis and the application of ANT (see chapter 3.0 Conceptualisation for a discussion on these).

6.7 Conducting the interviews

Immediately before the start of each interview, I set-up the recording equipment to ensure that the cam-corder could view what was to be placed on the table-top whilst not revealing the respondent, arranged the furniture to enable the respondent to talk off camera but turn pages easily, and laid out the following hard-copy documents: briefing sheet, consent form and schedule of questions (see figure 15 for a copy of the schedule of questions, figure 14 for a copy of the consent form concerning the main study, and Appendix A for a copy of the consent form concerning the pilot study). Doing all this before the respondent arrived allowed me to focus on that person when they arrived.
Researcher: Garry Layden, research student, garry.layden@beds.ac.uk

 Introductory material [prior to recording]:

Please don’t mention anything that might help a third party to identify your name, or your tutors, or this institution. I will try to do the same.

During our interview, I’ll be referring to a schedule of questions that is written here. This is just to remind me of what I’d like to hear you talk about. I hope it won’t put you off. If you wish, you may have a copy.

 Introductory material [whilst recording]:

Hello, thank you for making time for this interview today. Just for the record, how are you?

For the record, can you tell me what course you are on, and what year?

For the record, can you tell me what you have brought for this interview today: how many sketchbooks and from which year/s of your study?

For the record, can you please confirm that you have read the Consent Form and signed it? Can I remind you that you are free to end this interview at any time without explanation?

Are you comfortable? Are you ready to begin?

Main question areas [whilst recording]:

[At the first page] Before looking in detail at your sketchbook, can you summarise what you had been asked to do here? What was the project/workshop/task?

[Pointing to the first item on the page] So, was this the first thing you did?

What were you trying to do here?

Why did you choose this approach/technique first? Did you choose it independently, or did your tutor advise/direct you?

Did you plan your approach in advance (if so, for how long and in how much detail), or did you work more instinctively or organically? What made you take one or other of these?

How long did you spend on the approach/technique? Do you think that was long enough/too long/about right?

Was this work you carried out in the studio or in your own time?

Did you expect to discuss this approach/technique with anyone – tutor/s, student/s or anyone else? Did you discuss it with anyone – tutor/s, student/s or anyone else?

[Pointing to subsequent items] What did you do next?

[See questions above]

How did this connect with the previous approach/technique, if at all?

After a few pages:

As you worked on this task, did you feel you knew what you were doing, where you were going?

Once you’d completed a page in your sketchbook, did you return to it? Did you add to it? If so (or if not), why?

Did you think your sketchbook was a useful resource for future reference (and, if so, how)? Do you still think that (and, if so, why)?

As appropriate, if a particularly interesting/significant/puzzling item appears:

So, what were you thinking at this point?
Why didn’t you do… [suggest something other approaches here]?

At the end of each project/workshop/task:

Overall, how do you think the project/workshop/task went?

Did you get feedback from your tutor/s (or from other students) on how the project/workshop/task went? If so, was that helpful?

To what extent do you think the success (or otherwise) of the project/workshop/task depended on the success (or otherwise) of the work we have been looking at here?

Overall, is there anything you’d do differently next time, and, if so, what and why?

Did you do any tasks that are not in your sketchbook? If so, what tasks, and why are they not there?

For subsequent projects/workshops/tasks: return to questions above.

More general questions:

What advice have you been given on design ideation using the sketchbook, and by whom?

Is there anything else you want to tell me, or you think I should have asked?

Examples: better/different feedback, better/different tuition, better/different teaching and assessment tasks, better/different CAD tuition…?

On conclusion of the interview:

Thank you very much for your time.

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**Figure 15 – Interview question areas concerning main study (see Appendix A for pilot study documentation)**

The aims of these questions and supporting statements are discussed below.

### 6.7.1 Interview questions: ‘Introductory material [prior to recording]’

‘Please don’t mention anything that might help a third party to identify your name, or your tutors, or this this institution. I will try to do the same.’

This statement was included to help meet the requirements of the Research Ethics approval, and also to reassure the respondent that they could talk without fear of a third party getting to know for certain what they had said.
‘During our interview, I’ll be referring to a schedule of questions that is written here. This is just to remind me of what I’d like to hear you talk about. I hope it won’t put you off. If you wish, you may have a copy.’

This statement was included to reassure the respondent that the interview was being conducted in as open a way as possible: the schedule of questions was not secret – I had brought spare copies and was happy to give one to the respondent before starting the interview. It may be enquired why I did not give this to the respondent without being asked. This was because I did not want the interview to begin with too much paperwork. Each respondent was asked to sign a consent form and provided with a consent information sheet to read before signing this. I thought that requiring the respondent to read further paperwork could make the interview seem unduly bureaucratic and, perhaps, cause him/her to feel uncomfortable.

6.7.2 Interview questions: ‘Introductory material [whilst recording]’

‘Hello, thank you for making time for this interview today. Just for the record, how are you?’

‘For the record, can you tell me what course you are on, and what year?’

‘For the record, can you tell me what you have brought for this interview today: how many sketchbooks and from which year/s of your study?’

These questions were included to provide the respondent with an opportunity to become comfortable sharing information whilst being video-recorded. In addition, the second question was used to provide basic details that would allow me to locate these data in terms of the respondent’s course and academic level of study, and the third with the aim of directing the respondent’s attention towards the sketchbook material and away from the video-camera.
‘For the record, can you please confirm that you have read the Consent Form and signed it? Can I remind you that you are free to end this interview at any time without explanation?’

The above questions were included as reminders that the respondent had agreed to be interviewed but could exit at any time without giving reasons. Although I had on file each signed consent form and regarded each interview as unlikely to result in conflict, I thought it worthwhile capturing on video that the consent form had been read and signed.

‘Are you comfortable? Are you ready to begin?’

These questions were included to signal the start of the discussion on the respondent’s ideational methodology and sketchbook material, and to allow him/her to raise issues such as difficulty in hearing my questions clearly because of excessive background noise, discomfort caused by glare, or a wish to ascertain that the video-recording would not result in their being identified.

6.7.3 Interview questions: ‘Main question areas [whilst recording]’

‘[At the first page] Before looking in detail at your sketchbook, can you summarise what you had been asked to do here? What was the project/workshop/task?’

These questions were included to invite the respondent to offer a general introduction to the project work to be viewed, including what design challenge the project brief entailed, where the site was (if applicable), what the project timeline comprised, and whether it was a group or individual project. If the respondent did not mention these things, I generally asked supplementary questions.

‘[Pointing to the first item on the page] So, was this the first thing you did?’
This question was included to begin to explore the timeline to the sketchbook material discussed. It could not be presumed – and should not be assumed – that the first item shown was the first item produced. That said, in some interviews such information was proffered by the respondent without having been asked.

“What were you trying to do here?”

This question, if necessary accompanied by my pointing to a selected ideational move, was included to encourage the respondent to discuss the sketchbook material more expansively. That said, in some interviews such information was proffered by the respondent without having been asked.

“Why did you choose this approach/technique first? Did you choose it independently, or did your tutor advise/direct you?”

“Did you plan your approach in advance (if so, for how long and in how much detail), or did you work more instinctively or organically? What made you take one or other of these?”

“How long did you spend on the approach/technique? Do you think that was long enough/too long/about right?”

“Was this work you carried out in the studio or in your own time?”

“Did you expect to discuss this approach/technique with anyone – tutor/s, student/s or anyone else? Did you discuss it with anyone – tutor/s, student/s or anyone else?”

These questions, if necessary accompanied by my pointing to a selected ideational move, were included to encourage the respondent to reveal more about the background to the work, if they had not already done so. The questions were not designed solely to elicit the
information specified, but to persuade the respondent to talk more expansively about their working practices and the help they received.

‘[Pointing to subsequent items] What did you do next?’

This question was used to signal that I regarded it as appropriate to move onto the next ideational move, which would be explored by means of the questions already discussed – hence: ‘[See questions above]’.

‘How did this connect with the previous approach/technique, if at all?’

This question, if necessary accompanied by my pointing to a selected ideational move, was included because I wanted the respondent to discuss not only individual ideational moves but connections between them. That said, in some interviews such information was proffered by the respondent without having been asked.

6.7.4 Interview questions: ‘After a few pages’

‘As you worked on this task, did you feel you knew what you were doing, where you were going?’

‘Once you’d completed a page in your sketchbook, did you return to it? Did you add to it? If so (or if not), why?’

‘Did you think your sketchbook was a useful resource for future reference (and, if so, how)? Do you still think that (and, if so, why)?’

These questions were included to encourage the respondent to reveal information about his/her ideational methods, if s/he had not already done so. Each question was designed to approach this topic from a slightly different direction thereby giving the respondent several opportunities to provide the data. These questions were not designed solely to elicit the
information specified but to persuade the respondent to talk more expansively about their ideational methods.

‘As appropriate, if a particularly interesting/significant/puzzling item appears:

So, what were you thinking at this point?

Why didn’t you do… [suggest something other approaches here]?’

These questions were included to encourage the respondent to reveal their thoughts about their ideational methods, if they had not already done so. The questions were not designed solely to elicit the information specified but to persuade the respondent to talk more expansively about their ideational methods.

‘At the end of each project/workshop/task:

Overall, how do you think the project/workshop/task went?

Did you get feedback from your tutor/s (or from other students) on how the project/workshop/task went? If so, was that helpful?

To what extent do you think the success (or otherwise) of the project/workshop/task depended on the success (or otherwise) of the work we have been looking at here?

Overall, is there anything you’d do differently next time, and, if so, what and why?’

These questions were included to encourage the respondent to evaluate their ideational methods and share the evaluations of others, if they had not already done so. Each question was designed to approach this topic from a slightly different direction thereby giving the respondent several opportunities to provide the data. The questions were not designed solely
to elicit the information specified but to persuade the respondent to talk more expansively about their ideational methods.

‘Did you do any tasks that are not in your sketchbook? If so, what tasks, and why are they not there?’

These questions were included to encourage the respondent to discuss ideational moves that could not be seen in the sketchbook material, if they had not already done so.

6.7.5 Interview questions: ‘For subsequent projects/ workshops/ tasks: return to questions above’ and ‘More general questions’

‘What advice have you been given on design ideation using the sketchbook, and by whom?’

‘Is there anything else you want to tell me, or you think I should have asked?’

Examples: better/different feedback, better/different tuition, better/different teaching and assessment tasks, better/different CAD tuition…?’

These questions were included to provide the respondent with further opportunities to discuss and evaluate their sketchbook material, ideational moves and the support received.

It should be reiterated here that the above questions were not used as a formal questionnaire but as prompts to enable me to ensure that each respondent’s ideational moves and sketchbook material were explored thoroughly within the time available.

6.8 Transcribing the video-recordings

The transcription of the video-recordings was carried out in two ways. Within the pilot study I transcribed all but the last video-recording in order to keep as close to the data as possible: in
other words, to hear personally what was being said, see personally what was being shown, and make decisions personally about what should and should not be included in the transcription. These transcripts documented spoken words; what could be seen in the sketchbook material; non-verbal interactions visible between the respondents, myself and the sketchbook material; and information that the video-recordings did not show, such as descriptions of events that could be heard or seen by the participants but were off-camera. These data were documented because I wished also to analyse how the respondents behaved during the interviews, together with the broader context. Sounds such as ‘um’ and ‘ah’ were mostly omitted because these appeared to contribute nothing of value. A sample of the transcript of respondent 07’s video-recording is shown in Appendix B. The black text documents what was said and by whom (‘GL’ denotes myself, ‘07’ respondent 07); the blue text documents sketchbook material revealed, other matters I regarded as relevant, such as a respondent’s laughter or a distraction off-camera, and – although this did not occur until the constructivist grounded theory phase of the study – details of discursive behaviour such as pointing and page-turning. This sample I regard as typical of all the transcripts I produced.

The final pilot study transcript was produced by means of an external transcription service to allow me to ascertain whether this approach was likely to be of benefit during the main study. Transcribing the first five video-recordings had been extremely time-consuming and had delayed the progress of the data analysis. I hoped that the employment of an external transcriber would make the process less time-consuming. Unfortunately, the transcript I received documented only what was said and by whom, making it necessary for me retrospectively to add information on what could be seen in the sketchbook material, plus: non-verbal interactions visible between the respondents, myself and the sketchbook material; and information that the video-recordings did not show, such as descriptions of events that could be heard or seen by the participants but were off-camera. As a consequence, the production of this transcript remained quicker overall than the production in full by me of the earlier ones, but not significantly so. A sample of the transcript of respondent 11’s video-recording is shown in Appendix C. The black text documents what was said and by whom (‘GL’ denotes myself, ‘11’ respondent 11); the blue text documents discursive moves,
sketchbook material revealed and other matters regarded as relevant. This sample I regard as typical of all the transcripts produced by the external transcriber.

As the five transcripts I produced during the pilot study and the one produced by an external transcriber and enhanced by me are all regarded as being equivalent as data sources, and the latter appeared to offer only a small reduction in the production time, I resolved personally to transcribe the video-recordings of the main study interviews wherever possible. This led to all six of the video-recordings of the interviews carried out at the high-ranking institution being transcribed personally, following the same protocol I used to transcribe personally the pilot study video-recordings. Once again, however, again the transcription process took a great deal of time and delayed the analysis of the data. Thus the video-recordings of the four interviews carried out at the former polytechnic were transcribed externally, following the same protocol used to transcribe externally the pilot study video-recording.

7.0 Diagramming

7.1 Preamble

Several writers address the use of diagrams in grounded theory (Strauss and Corbin (1998); Strauss (1987); Clarke (2005)), but, regarding this study, I found Charmaz’s (2006) discussion most helpful. Diagrams can be used by grounded theorists ‘…to tease out relationships while constructing…analyses and to demonstrate these...in their completed works.’ (Charmaz, 2006, p. 117) When the research reveals a range of processes and/or categories and it is not clear how to organise and assimilate the memos, using diagrams can help with this process (Charmaz, 2006). Also, when something more promising emerges, diagrams can be utilised to represent that. These processes are connected to sorting:

‘In grounded theory...sorting serves your emerging theory. It gives you a means of creating and refining theoretical links...[S]orting prompts you to compare categories at an abstract level.’ (Charmaz, 2006, p. 115)
To begin with, I was wary of representing my analysis in a visual manner in case it was too complex for this to be done effectively, resulting in diagrams that were either impenetrable or overly simple. There was also concern that overly simple diagrams could appear highly persuasive whilst providing misleading representations of the data (Charmaz, 2006). That said, as was noted in section 4.14 Axial coding, I was dissatisfied with the results of the analysis-to-date. Thus began an exploration of possible diagrammatic representations of the research findings, working firstly freehand on gridded paper, and then digitally on the laptop. The diagrams produced went through numerous changes before reaching their final form (see Appendix I for examples of preliminary diagrams). My overall approach was informed by a wish to display the analysis, encourage the viewer to focus on the content rather than the design or formulation of the diagrams, avoid distortion of the information, reduce the analysis to practical size whilst maintaining clarity and consistency, and describe it in such a way as to enable comparisons to be made (Tufte, 2001). The ‘timeline’ and ‘synoptic’ diagrams (see section 7.2 Design of final diagrams) were intended to ‘reveal the data at several levels of detail, from a broad overview to the fine structure’ (Tufte, 2001, p. 13) Thus, the ‘synoptic’ diagrams condensed the categories, sub-categories and connectedness identified in each video-recording into an overall summary, whilst the ‘timeline’ diagrams revealed the categories and sub-categories chronologically.

In that their aim was to display ‘…things in the physical or logical world, reproduced at a scale smaller than life sized…’ (Fawcett-Tang, 2005, p. 10) I regarded these diagrams as maps, each of which ‘…provides a view that slides instantaneously between panorama and detail…We…divine a previously unseen pattern in things we thought we knew intimately.’ (Fawcett-Tang, 2005, p. 11) I also applied principles concerning narratives of space and time, and narrative itineraries in particular (Tufte, 1990), and the ‘timeline’ diagrams I regard as a variation of the ‘space-time grid’ (Tufte, 1990, p. 110).

7.2 Design of final diagrams

I produced two types of final diagram. Each emerged out of the axial coding (see section 4.3 Axial coding) and comprise the following basic symbols: a larger circle representing an
ideational move, and a smaller circle representing a discursive move, both colour coded to represent each category and sub-category (see figures 16 and 17).

**Figure 16** – Diagrammatic representation of eleven ideational moves, colour coded to show the category, *IT-A: Uses paper-based ideation tools response to a spatial design matter*, and including the sub-category number, [33], and number of moves allocated.

**Figure 17** – Diagrammatic representation of sixty-one discursive moves, colour coded to show the category, *IM-T: Carries out a move during the interview without apparent encouragement from the interviewer*, and including the sub-category number, [68], and the number of moves identified.
As will be seen, these circles contain the category/sub-category number and the number of times it is applied: for example, how many photographs, physical models, paper-based freehand sketch diagrams or unprompted page-turns it represents. Each is also sized to indicate the number of applications. Thus, in any given circle, the viewer can see the category (shown as a colour), category or sub-category (shown as a unique number) and number of applications (shown as a number and the overall size of the circle). The colour-coding and the circle size are intended to provide a navigation aid for the viewer.

The ‘timeline’ diagram seeks to show the course of the interview, starting at the beginning of the discussion on the relevant design project, and reading from left-to-right along an approximate timeline – see figure 18.
Figure 18 – ‘Timeline’ diagram representing the video-recording of respondent 01’s interview
This is not the timeline of the interview per se, nor the video-recording or transcript, nor the sketchbook material produced, nor of the student's design project. It shows the timeline of my tabulated analysis of the video-recording and transcript, so it is several steps away from the initiating event. This is necessary because the sketchbook material, and the respondent's account of it, cannot be expressed accurately as a timeline. The interviewer cannot actually find out the sequence of ideational moves used simply by listening to the interview on the video-recording, watching as the sketchbook material is revealed, and reading the transcript. For example, a page comprising, say, several paper-based freehand sketch diagrams and perspective sketches, blocks of hand-written text, and photographs, may have been produced in a variety of sequences. The photographs may have been the last items added to the page but they may have been taken before the sketches were produced; the sketches may have been produced at one sitting or over several; the text may have been added all in one go or sentence-by-sentence on several occasions. Thus, the sketchbook material cannot be seen as a completely transparent record of an ideation journey, but a rough – and at times unreliable – sketch of it. Even if the person who created the sketchbook is present to explain it, s/he may not remember the sequence accurately or explain it clearly.

The ‘synoptic’ diagram seeks to show every category, sub-category and connection, with no indication of a chronology. If the ‘timeline’ diagram is equivalent to a rough sketch, this may be seen as a snapshot of my tabulated analysis of the interview video and transcript. It is therefore identified as a ‘synoptic’ diagram – see figure 19.
Producing these diagrams required me to add up categorised and sub-categorised ideational moves and discursive moves. The difficulties of doing this will be discussed below, however, it is important to point out here that this study is not concerned with statistical analysis: it has not been my intention to analyse the respondents’ discursive and ideational moves quantitatively, nor would this have been possible. Regarding ideational moves, in the video-recordings it was not always clear where one sketch ended and another began, whether one larger sketch was actually two smaller ones overlapping. Some sketchbook pages are revealed so briefly that their contents cannot be enumerated, or are discussed whilst off-camera because the sketchbook was moved out of shot during the interview without my noticing this at the time. Multiple sheets of non-visuo-spatial research cannot be ‘counted’ because the quantity of secondary research is unclear. A series of digital images cannot be ‘counted’ unless it can be determined whether they are separate drawings or all different views of one digital model.
I also found it difficult to enumerate every discursive move. For example, respondent 05 gestured so vaguely that I was not sure whether she was gesturing at all, whilst respondent 13 pointed repeatedly to the same item with such speed that I was unsure whether to count this as one move or several.

Other similar challenges prevented quantitative precision in this study. Thus, the research settings are inexact, variable and complex. As a consequence, all of the diagrams should be seen as an approximation.

### 7.3 What the diagrams do not show

Because the ‘synoptic’ diagrams bear a superficial resemblance to transport system maps representing ‘both time and spatial experiences’ (Tufte, 1990, p. 102), it is easy to see the lines connecting the categories/sub-categories as denoting routes between ideational or discursive moves. This interpretation would be incorrect. Rather than a series of journeys, the lines show a series of instances where, in my judgement, the respondents made more than one ideational move together.

Also, a given ‘synoptic’ diagram may be understood as showing a respondent starting at certain category or sub-category, and making a series of trips to other categories or sub-categories. This interpretation would not be correct. Each line may actually connect a range of ideational moves revealed on the same sketchbook page. Clearly these will have been made in a specific sequence, however, I am not interested in that but in the extent to which the respondent used ideational moves in a connected manner here.

Finally, the layout of the diagrams might be construed as illustrating the overall geography of the video-recording, or of the design methodology as recounted by the respondent and revealed in the sketchbook material. This interpretation would be incorrect. None of the diagrams should be read as starting from, say, left to right or top to bottom, nor should certain categories or sub-categories placed on the edge of a diagram be perceived as less important
than those that are more centrally-located: the ‘synoptic’ diagrams do not illustrate a positional hierarchy.

In defence of these diagrams I would argue that it was necessary to place the various circles and lines somewhere; that the diagramming process started with the video-recording of the first – and what turned out to be the simplest – of the interviews, and the result of that became a basic template to aid comparison across different diagrams; and that it has been made clear in this thesis how to read each diagram and what pitfalls to avoid.

8.0 Analysis and findings

8.1 Preamble

In chapter 4.0 Research methodology it was stated that I conducted focused interviews with spatial design undergraduates at three contrasting institutions, that these interviews were video-recorded and transcribed, and that the transcripts and video-recordings were analysed initially through a process of open and focused coding. It was also stated that I found the coding process unhelpful because it produced an unmanageable quantity of descriptive codes, sub-codes and sub-sub-codes, but did not lead to more abstract categories and sub-categories. A sample of those codes, sub-codes and sub-sub-codes is shown in tables 3 and 4 in chapter 4.0 Research methodology but they are not examined further here for two reasons. Firstly, having identified during open and focused coding what appeared to be a key distinction between the moves made in order to describe and/or explain matters, and those made in order to ask and attempt to answer questions, I found following further reflexive practice that these two kinds of move were difficult to distinguish with confidence in the respondents’ sketchbook material. Secondly, although the codes per se informed my subsequent analysis in a general way by suggesting possible themes that could become categories and sub-categories, they did not lead directly to them. Instead, the categories and sub-categories resulted from detailed axial coding informed by the extensive use of memos. Thus, chapter 8.0 Analysis and findings takes up the narrative at the start of the axial coding and focuses on that, on the resultant categories and sub-categories identified
concerning ideational and discursive moves, on the representation of these diagrammatically, and on the analysis of the diagrams within the conceptual framework of ANT. At its conclusion, seven categories of ideational move and twenty sub-categories had been developed (see table 7), together with seven categories of discursive move and eight sub-categories (see table 8). The journey to this outcome involved the creation of considerably more categories and sub-categories, followed by my making cross-comparisons and producing extensive memos on the data and the analysis. This led to many amendments, deletions and mergers, all of which I displayed on a three-hundred-and-two-page table. Initially, I intended that that table would allow the codes and sub-categories to be viewed synoptically, but, when it became too large, I continued to use it as a comparatively convenient means of storage and display. Table 6 illustrates a sample page, and shows a variety of cases where categories and sub-categories were changed, subsumed or deleted. This refining process is examined in detail below.

8.2 Axial coding, categories and sub-categories

8.2.1 Ideational moves

Let us examine the sub-category [4] Uses a word-based approach in response to a spatial design matter. This was previously defined as [4] Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation, but, following a period of reflexivity, I determined that the earlier definition was inappropriate because, as I have already noted, asking and attempting to answer questions could not be distinguished from describing or explaining with confidence.

The sub-category [4] Uses a word-based approach in response to a spatial design matter shows changes to the dimensions. The dimension When I deleted because it proved impossible to identify with certainty when during a project a respondent had made a given ideational move: I could ascertain when during the video-recording the ideational move was revealed/discussed, but this could be expressed more clearly in the ‘timeline’ diagrams than as a word-based dimension. The dimension How much/often I deleted because How much
and *How often* are arguably not the same thing: if I eat six cakes in one hour this is not the same as eating six cakes, one a day, over six days. Also, I again judged that information on *How much* and *How often* could be expressed more clearly in the ‘timeline’ diagrams than as a word-based dimension. The dimension *Understanding, Confidence and independence* I deleted because I found it extremely difficult to identify reliably and consistently to what extent a given ideational move demonstrated these characteristics. The dimension *Size of design move* I deleted because I deemed it impossible to gauge this reliably and consistently: what I regarded as a small design move might have been large to the respondent, or *vice versa*.

As another example, let us examine the sub-category [20] *Produce and uses paper-based freehand perspective sketches to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter*. This I found, following a reflexive review of the data and analysis, to be in effect a duplicate of the sub-category [6] *Produce and uses paper-based freehand perspective sketches to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter*, thus I merged the two. The allocation of the latter I then found to be inappropriate in this situation because the data revealed that the paper-based freehand perspective sketch referred to had already been sub-categorised, so I deleted it.
Table 6 – Excerpt from the table of axial coding categories and sub-categories (sample – see Appendix G for a larger sample)
By using the approach summarised above extensively, I identified the categories and sub-categories shown in table 7.

<table>
<thead>
<tr>
<th>Category IT-A: Uses paper-based ideation tools response to a spatial design matter</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sub-category [4]:</strong> Uses a word-based approach in response to a spatial design matter</td>
</tr>
<tr>
<td><strong>Sub-category [6]:</strong> Produces and uses paper-based freehand perspective sketches in response to a spatial design matter</td>
</tr>
<tr>
<td><strong>Sub-category [12]:</strong> Produces and uses collage to investigate design ideas</td>
</tr>
<tr>
<td><strong>Sub-category [31]:</strong> Produces and uses paper-based freehand plan sketches in response to a spatial design matter</td>
</tr>
<tr>
<td><strong>Sub-category [32]:</strong> Produces and uses paper-based freehand section sketches in response to a spatial design matter</td>
</tr>
<tr>
<td><strong>Sub-category [33]:</strong> Produces and uses paper-based sketch diagrams in response to a spatial design matter</td>
</tr>
<tr>
<td><strong>Sub-category [39]:</strong> Produces and uses paper-based freehand elevation sketches in response to a spatial design matter</td>
</tr>
<tr>
<td><strong>Sub-category [40]:</strong> Produces and uses paper-based plan drawings, hand-drawn using a straight edge, in response to a spatial design matter</td>
</tr>
<tr>
<td><strong>Sub-category [41]:</strong> Produces and uses paper-based perspective drawings, hand-drawn using a straight edge, in response to a spatial design matter</td>
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<tr>
<td><strong>Sub-category [42]:</strong> Produces and uses paper-based elevation drawings, hand-drawn using a straight edge, in response to a spatial design matter</td>
</tr>
<tr>
<td><strong>Sub-category [43]:</strong> Produces and uses paper-based isometric drawings, hand-drawn using a straight edge, in response to a spatial design matter</td>
</tr>
<tr>
<td><strong>Sub-category [58]:</strong> Creates and uses painting/s experimentally in response to a spatial design matter</td>
</tr>
<tr>
<td><strong>Sub-category [73]:</strong> Produces and uses paper-based section drawings, hand-drawn using a straight edge, in response to a spatial design matter</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category IT-B: Carries out research in support of design ideation</th>
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<tbody>
<tr>
<td><strong>Sub-category [9]:</strong> Carries out supporting visuo-spatial research in connection with design ideation</td>
</tr>
<tr>
<td><strong>Sub-category [45]:</strong> Carries out non-visuo-spatial research (eg: textual, auditory, interview based...) in connection with design ideation</td>
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<tr>
<th>Category IT-C [22]: Produces and uses photographs in response to a spatial design matter</th>
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</table>

<table>
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<tr>
<th>Category IT-D [49]: Uses real materials in response to a spatial design matter</th>
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</table>

| Category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter |
8.2.2 Discursive moves

Discursive moves have already been mentioned several times in this thesis, but it was whilst reviewing the video-recordings of the pilot and main study interviews during the ‘evolved’ grounded theory phase that I became acutely aware of additional data that needed to be analysed: data concerning how the respondents interacted with me and with the sketchbook material during the interviews. I use the phrase ‘acutely aware’ here because, during the open and focused coding, I had noticed instances where, for example, a respondent seemed not to answer a question I had asked, discussed a different item of sketchbook material than the one I had indicated, or turned a page without my prompting it. I called these discursive moves (see section 1.7 ‘Discursive moves’) but had thus far considered them to have limited relevance to this study because my focus was on the sketchbook material. During the ‘evolved’ grounded theory phase, I began to suspect that these discursive moves might have something important to tell me about spatial design undergraduates’ discussion of ideational moves in an academic context. Coding the data presented me with certain challenges. Determining whether or not a respondent had, say, pointed to an item of sketchbook material involved a process of interpretive, reflexive, visual analysis of the interview data. Figures 20
to 22 show examples of pointing actions from the video-recordings of the interviews with respondents 13, 11 and 03, and figures 23 to 25 show gesturing actions from the video-recordings of the interviews with respondents 11, 13 and 05.

Figure 20 – Respondent 13: pointing action

Figure 21 – Respondent 11: pointing action
Figure 22 – Respondent 03: pointing action

Figure 23 – Respondent 11: gesturing action
Figure 24 – Respondent 13: gesturing action

Figure 25 – Respondent 05: gesturing action
In figure 25, this approach was used to determine:

- whether the respondent was pointing/gesturing to a specific item of sketchbook material, or gesturing more generally/vaguely towards the page

Having identified certain challenges, in figures 26 and 27 I explain the process I used to code discursive moves. These figures show still images from the video-recordings of the interviews with respondents 10 and 05 respectively. They are included as examples, but it should be noted here that each video-recording includes evidence of the respondent making discursive moves.

Figure 26: image 01 shows the very start of the interview: a number of loose sheets of paper covered the table-top in what appeared to be a fairly random way. I commenced the interview excited at the sight of paper-based freehand perspective sketches, plan sketches and diagrams; a hand-annotated CAD drawing; and hand-written text. In image 02 we see a similar view, but at this point respondent 10, having said nothing about the work, was mentioning an off-screen site plan. Images 03 to 06 inclusive reveal what was happening when the respondent began to discuss digital drawings on her laptop: gradually she, and I, moved the loose sheets of paper to one side, having not referred to them. Images 07 to 15 inclusive show respondent 10 continuing to discuss the images on her laptop, and in image 16 I can be seen removing the laptop in the hope of bringing the conversation onto the loose sheets. Image 18 reveals the point when respondent 10 said she wanted to talk about all of the drawings on these sheets at the same time. However, she did not do this. Instead, she began to arrange them neatly in rows and columns on the table-top; images 19 to 24 inclusive show this process taking place. Between images 25 to 29 inclusive respondent 10 continued to not discuss the various drawings visible. She also did not point to them – indeed, on occasions she gripped one hand with the other, thereby temporarily immobilising both. Although image 29 appears to show respondent 10 pointing to a sheet containing paper-based freehand sketches, in my judgement she was actually resting her hands on the table.
Image 30 shows me, in frustration, attempting once again to bring the conversation onto the sketchbook material.

Whilst carrying out the interview with respondent 10, I was both excited and disappointed: the work on the table looked varied, connected and competent, and I wanted to hear what she had to say about it, but she spoke about other things instead (mostly Alexander McQueen’s ‘Sarabande’ charity). It was the realisation that this respondent, whilst not talking about her drawings, was arranging them neatly in rows and columns on the table-top, that made me suspect that the data on discursive moves in the video-recording and transcript needed to be analysed carefully.
01 – Start of interview with Respondent 10

02 – Respondent 10 discusses off screen site plan

03 – GL ‘...should I be directing the camera at those...?’

04 – Respondent 10 helps move sketchbook items

05 – Respondent 10 begins to reveal laptop

06 – Respondent 10 continues to reveal laptop

07 – Respondent 10 discusses image on laptop

08 – Respondent 10 ‘...only...two floors...’

09 – Respondent 10 discusses image on laptop

10 – Respondent 10 ‘...tips and tricks in Sketch Up.’

11 – Respondent 10 lifts sketches not discussed...

12 – ...whilst discussing image on laptop
13 – GL ‘…so this building…?’
14 – Respondent 10 ‘…I’m…trying to achieve that…’
15 – Respondent 10 ‘…different docking stations…’
16 – GL ‘…may move this now…’
17 – GL ‘…the first sheet that you want to talk about?
18 – Respondent 10 ‘…Probably all of them…’
19 – Respondent 10 arranges sketchbook material
20 – Respondent 10 arranges sketchbook material
21 – Respondent 10 arranges sketchbook material
Respondent 10 arranges sketchbook material

22 – Respondent 10 arranges sketchbook material

23 – Respondent 10 arranges sketchbook material

24 – Respondent 10 “...different docking stations...”

Respondent 10 squeezes one hand with the other

25 – Respondent 10 does not discuss sketchbook material

26 – Respondent 10 does not discuss sketchbook material

27 – Respondent 10 does not discuss sketchbook material

28 – Respondent 10 does not discuss sketchbook material

29 – Respondent 10 does not discuss sketchbook material

30 – GL attempts to discuss sketchbook material
Figure 26 – Samples of discursive moves evidenced in the video-recording of the interview with respondent 10
**Figure 27:** images 01 to 05 inclusive show respondent 05 talking broadly about her project work whilst flicking through what she called her notebook and not selecting any sketchbook material to illustrate the points she was making. Image 06 reveals her tabling what I regarded as a very interesting hand-annotated perspective sketch, but, in image 07, we see her removing this from view without having discussed it, and images 08 to 15 show her continuing to flick through her notebook without appearing to choose any material. At image 15, ‘GL brings the sketch into view’: here I was trying to encourage the respondent to talk about the hand-annotated perspective sketch, but I did not succeed – images 17 to 21 inclusive show her continuing to flick through her notebook, and, although image 22 appears to indicate her pointing to the sketch, she was actually pointing to the empty space next to it whilst mentioning her thoughts about what she should design ‘…in the ceiling…’. Images 23 to 26 inclusive reveal respondent 05 at last discussing the sketch, however, rather than telling me about it as an ideational move, she stated that she might manipulate it in Photoshop, and then began to discuss her Wacom tablet. In image 27 we see the point when I decided to mention how little time was left for the interview. As image 29 indicates, however, respondent 05 removed the sketch from view. After this, feeling somewhat frustrated with the course the interview had taken thus far, I attempted to take control. For some minutes I had glimpsed the edge of a paper-based freehand sketch underneath one of the respondent’s sketchbooks. Image 30 shows me revealing this more fully. However, by doing that I seemed to remind the respondent of a number of sheets containing sketchbook material that she had forgotten. Images 31 to 39 inclusive show her laying these out, one after another, without referring to their contents except to say, at image 36, ‘…these are actually all my drawings…’ My reaction to this was to panic (hence, my statement at image 37, ‘…I must try not to…panic…’). Images 40 and 53 show me attempting to navigate through these sketches, occasionally asking a question (‘What’s this?’) or making a comment (‘I don’t think many of our students use tablets…’). Image 54 reveals respondent 05 tabling the sketch I had glimpsed earlier in the interview. Images 55 to 57 inclusive show respondent 05 talking about that sketch, mentioning briefly its genesis (‘…my first rough…’) and what happened to it (‘…I scanned this into Photoshop…’). At image 58, I state, ‘…we need to finish…’ because I am aware that the interview has lasted more than one hour. Between images 59 and 66 inclusive, we see a
sequence of moves during which a sketch is tabled by me, its authorship is discussed briefly (it transpired that it was not respondent 05’s), and it is then put to one side. Images 67 and 71 inclusive show me putting further sketches to one side without these being talked about, and image 72 reveals the respondent doing a similar thing. During the final sequence of images, between 73 and 76 inclusive, we see me (feeling somewhat perplexed by now) at the point of saying, ‘…we should stop…’, and respondent 05 flicking through her sketchbooks, closing her notebook, and, as a final gesture, tidying up and bringing two sketchbooks together as though shutting two sliding doors.

Whilst analysing the video-recording and transcript of the interview with respondent 05 during the ‘evolved’ grounded theory phase, I occasionally used the word ‘dance’ to denote how I attempted to gain information on the sketchbook material respondent 05 had tabled, and she – as far as I could tell – attempted to not give it to me. I later came to regard this word as inappropriate: to me, her behaviour was more like a ‘cat and mouse game’. I could not know for sure that she was consciously doing this, nor, if she was, why. However, these speculations made me suspect that the data on discursive moves in the video-recording and transcript needed to be analysed carefully.
01 – GL ‘Keep going please.’

02 – Respondent 05 begins flicking through notebook

03 – Respondent 05 continues flicking through notebook

04 – Respondent 05 stops without choosing any material

05 – Respondent 05 continues talking generally

06 – Respondent 05 tables sketch to answer question

07 – Respondent 05 removes sketch without discussing it

08 – Respondent 05 begins flicking through notebook

09 – Respondent 05 continues flicking through notebook

10 – Respondent 05 continues flicking through notebook

11 – Respondent 05 ‘...this is more of a notebook...’

12 – GL ‘...there’s a lot of written work...’
Respondent 05 ‘This is my notebook.’

14 – Respondent 05 continues flicking through notebook

15 – Respondent 05 continues flicking through notebook

the sketch into view

17 – Respondent 05 continues flicking through notebook

18 – Respondent 05 continues flicking through notebook

19 – Respondent 05 ‘...I needed to be designing...’

20 – Respondent 05 ‘...it's been a shopping spree...'
Respondent 05 "...in the ceiling..."

23 – Respondent 05 proposes ‘Photoshopping’ sketch

24 – Respondent 05 mentions her ‘Bamboo’ tablet

Respondent 05 "...mine’s...the cheapest..."

26 – Respondent 05 ‘I should have brought my drawing...’

27 – GL ‘...we’ve got five minutes left...’

anything else...?"

29 – Respondent 05 removes drawing from view

29 – Respondent 05 removes drawing from view

GL ‘Is there anything else...?’

30 – GL pulls at a sheet that is visible

30 – GL pulls at a sheet that is visible
Respondent 05 reveals a sheet not requested

31 – Respondent 05 reveals another sheet

32 – Respondent 05 reveals another sheet

33 – Respondent 05 reveals another sheet

34 – Respondent 05 reveals another sheet

35 – Respondent 05 reveals another sheet

36 – Respondent 05 ‘…these are actually all my drawings…’

37 – GL ‘…I must try not to…panic…’

38 – Respondent 05 has revealed another sheet

39 – Respondent 05 has revealed another sheet
40 – GL has removed a sketch.

41 – GL brings a recently tabled sketch into view.

42 – GL brings another recently tabled sketch into view.

43 – Another recently tabled sketch is brought into view.

44 – GL points to the sketch.

45 – GL removes the sketch from view.

46 – GL brings another recently tabled sketch into view.

47 – Respondent 05 points to the sketch.

48 – GL removes the sketch from view.
'What's this…?'

GL removes sketch from view

50 – GL removes sketch from view

GL 'I don’t think many of our students use tablets…'

11:37

What’s this…?'

GL

51 – GL 'I don’t think many of our students use tablets…'

general discussion about tablet usage

52 –

53 – GL tables the design sketch discussed previously

54 – Respondent 05 tables another sketch

11:40

12:07

A

12:13

13:26

13:43

55 – Respondent 05 ‘…my first rough…’

56 – Respondent 05 ‘…I done all of this by hand…’

57 – Respondent 05 ‘…I scanned this into Photoshop…’
58 – GL ‘…we need to finish…’

61 – GL ‘…is that your drawing?’

62 – Respondent 05 lifts up the sketch

63 – Respondent 05 reveals another sketch
64 – Respondent 05 turns the sheet back over again

65 – GL points to the sketch

66 – GL puts the sheet to one side

67 – GL reveals a sketch and then puts it out of site

68 – Respondent 05 ‘…I've...drastically changed...’

69 – GL ‘...has...[the tablet] changed the way you draw...?'

70 – GL puts away another sketch

71 – Respondent 05 points to an 'invisible' drawing

72 – Respondent 05 puts away a sketch
Figure 27 – Samples of discursive moves evidenced in the video-recording of the interview with respondent 05
The process illustrated above resulted in seven categories, and eight sub-categories, of discursive move (see table 8).

### Categories and sub-categories concerning discursive moves:

**Category IM-T**: Carries out a move during the interview without apparent encouragement from the interviewer

- **Sub-category [68]**: Respondent turns a page without apparent encouragement from the interviewer
- **Sub-category [69]**: Respondent points to a page or an item on a page without apparent encouragement from the interviewer
- **Sub-category [71]**: Student showcases work without explaining and/or discussing it
- **Sub-category [72]**: Student appears not to answer the question that was asked
- **Sub-category [74]**: Identifies one or more pages in his/her sketchbook as being not yet complete
- **Sub-category [76]**: Student explains and/or discusses work without showcasing it

**Category IM-U [13]**: Mentions experiencing a design insight through his/her ideation activities

**Category IM-V**: Mentions being guided by internal/external educational experiences

- **Sub-category [5]**: Is being guided by external influences
- **Sub-category [29]**: Is being guided by internal educational experiences

**Category IM-W [38]**: Evaluates his/her design process in an overview

**Category IM-X [70]**: Presents his/her ideation work using multiple platforms

**Category IM-Y [7]**: Appears to be using dismissive words and phrases to describe his/her design ideation tools

**Category IM-Z [75]**: Respondent indicates having a different understanding of the meaning of design than I have

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**Table 8 – Categories and sub-categories of discursive move allocated**

I displayed the categories and sub-categories in the diagram shown in figure 28. This is termed the ‘timeline’ diagram, and it seeks to show the course of the interview, starting at the beginning of the discussion on the relevant design project, and reading from left to right along an approximate timeline (see chapter 7.0 Diagramming for a more detailed account of the context to the diagram and how to read it).
Figure 28 – Diagrams showing ideational and discursive moves over the course of the video-recording of each interview, reading from left to right along a timeline
From this, I produced another set of diagrams that collectively are termed the ‘synoptic’ diagrams. These seek to show the interviews synoptically: every category, sub-category and connection with no indication of a timeline (see chapter 7.0 *Diagramming* for a more detailed account of the context to these diagrams and how to read them).
Figure 29 – Diagrams showing the interviews synoptically: every category, sub-category and connection with no indication of a timeline
8.3 Analysis of the ‘synoptic’ diagrams

The analysis of the ideational move sub-categories, and categories that do not contain sub-categories, as displayed in the ‘synoptic’ diagrams, was carried out in a number of ways:

1. The categories which were allocated to each respondent were identified, listed and compared.
2. Any sub-categories contained with these categories were enumerated.
3. The sub-categories were listed and compared across the sample.
4. The numbers of allocations of each category and sub-category were enumerated and compared across the sample.
5. The connectedness of each category and sub-category was enumerated and compared across the sample.
6. The ‘timeline’ diagrams were analysed in terms of ideational move sub-categories, and categories that do not contain sub-categories, to identify possible patterns of combination and distribution.

Regarding discursive moves, analysis of the ‘timeline’ diagrams was carried out across the sample in a number of ways:

1. The categories which were allocated to each respondent were enumerated, listed and compared.
2. The sub-categories within those categories were enumerated and compared.
3. The numbers of allocations of sub-categories within the category IM-T: Carries out a move during the interview without apparent encouragement from the interviewer were enumerated and compared.
4. The numbers of allocations of the categories IM-U [13]: Mentions experiencing a design insight through his/her ideation activities, IM-V: Mentions being guided by internal/external educational experiences, IM-W [38]: Evaluates his/her design process in an overview and IM-Y [7]: Appears to be using dismissive words and phrases to describe his/her design ideation tools were enumerated and compared.
5. The ‘timeline’ diagrams were analysed to identify possible patterns of combination and distribution.

The diagrams in figures 28 and 29 were the result of my fine-grained analysis of the video-recordings and the transcripts of these, supported by the extensive production of memos. The text that follows summarises this fine-grained analysis, and the development of theory abstracted from, but grounded in, the original data.

8.4 Ideational moves – analysis of ‘synoptic’ diagrams

8.4.1 Identifying, listing and comparing categories

I began analysis of the diagrams illustrated in figure 29 by identifying, listing and comparing the categories they showed for each respondent. This revealed that the diagrams all share three categories:

IT-A: Uses paper-based ideation tools response to a spatial design matter
IT-B: Carries out research in support of design ideation
IT-C [22]: Produces and uses photographs in response to a spatial design matter

In addition, those diagrams concerning respondents 07, 11, 03, 13 and 05 share:

IT-A: Carries out paper-based ideation tools response to a spatial design matter
IT-B: Carries out research in support of design ideation
IT-C [22]: Produces and uses photographs in response to a spatial design matter
IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter

Those concerning respondents 07, 11, 03, 13 and 05 also share:
IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter

Those concerning respondents 07, 11 and 13 also share:

IT-G [56]: Produces one or more physical model/s in response to a spatial design matter

I suspected, and still suspect, that the ideational moves contained within these shared categories contributed significantly to a basic 'core' across the sample. However, remaining focused on the diagrams and the sample I became interested in the two respondents – 01 (Level 4) and 05 (Level 6) – whose diagrams excluded categories shared by the others and included categories the others did not. Neither contains:

IT-G [56]: Produces one or more physical model/s in response to a spatial design matter

Both contain:

IT-D [49]: Uses real materials in response to a spatial design matter

Respondent 01’s diagram excludes:

IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter

Respondent 05’s diagram alone contains:

IT-F [64]: Generates ideas in response to a spatial design matter by chance through an experiential, sensorial approach
I find these results intriguing. It is questionable whether diagrams showing categories of ideational move evidenced by only six respondents can reveal credible patterns: a larger sample may suggest a different pattern, or several, or none at all. Nonetheless, I believe there is a suggestion here that, whilst at a category-level the approaches of all the students within the sample suggest strong homogeneity, there is also evidence of heterogeneity. This possibility will be returned to below.

8.4.2 Enumeration of sub-categories contained within categories, plus categories that do not contain sub-categories

Having examined the categories, my next task was to study each diagram in order to enumerate the sub-categories contained within those categories, where applicable. The results are as follows:

Respondent 01: five sub-categories plus two categories that do not contain sub-categories – **seven** groups of distinct ideational moves in total

Respondent 07: sixteen sub-categories plus two categories that do not contain sub-categories – **eighteen** groups of distinct ideational moves in total

Respondent 11: fourteen sub-categories plus two categories that do not contain sub-categories – **sixteen** groups of distinct ideational moves in total, slightly fewer than in respondent 07’s diagram but somewhat more than in respondent 01’s diagram

Respondent 03: nine sub-categories plus one category that does not contain sub-categories – **ten** groups of distinct ideational moves in total, fewer than in the diagrams of respondents 07 and 11, but more than in respondent 01’s diagram
Respondent 13: eleven sub-categories plus two categories that do not contain sub-categories – **thirteen** groups of distinct ideational moves, fewer than in the diagrams of respondents 07 and 11, but more than in the diagrams of respondents 01 and 03.

Respondent 05: nine sub-categories plus three categories that do not contain sub-categories – **twelve** groups of distinct ideational moves, fewer than in the diagrams of respondents 07, 11 and 13, but more than in the diagrams of respondents 01 and 03.

If identifying, listing and comparing the categories of ideational move suggests strong homogeneity and indications of heterogeneity, enumeration of the sub-categories plus the categories that do not contain sub-categories indicates considerable heterogeneity. Respondent 07’s diagram contains the widest range of groups of distinct ideational moves across the sample, and respondent 01’s the narrowest, yet both were level 4 students (albeit at different institutions). Respondent 11’s diagram contains the second-widest range across the sample, and respondent 03’s the second narrowest, yet both were Level 5 students (albeit at different institutions). Respondent 13’s diagram contains a narrower range than those of respondents 07 or 11, but a wider range than those of respondents 01 and 03, yet respondents 13 and 05 were both Level 6 students (albeit at different institutions). The diagrams suggest that ideational move occurrence across the sample at the level of sub-categories, plus the categories that do not contain sub-categories, was heterogeneous and unpredictable, and that this cannot be explained satisfactorily by referring to the student’s academic level or institution. This suggestion will be returned to below.

**8.4.3 Tabulation of sub-categories contained within categories**

Having examined the sub-categories plus the categories that do not contain sub-categories, my next task was to tabulate both the categories, and the sub-categories within their respective categories – see **table 9**.
<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-category</th>
<th>Respondent 01</th>
<th>Respondent 07</th>
<th>Respondent 11</th>
<th>Respondent 03</th>
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<td></td>
<td></td>
<td>x 2</td>
<td></td>
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<td></td>
<td>[58]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x 1</td>
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<td>[73]</td>
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<td>x 1</td>
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<tr>
<td>IT-B:</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carries out research in</td>
<td>[09]</td>
<td>x 2</td>
<td>x 1</td>
<td>x 16</td>
<td>x 8</td>
<td>x 5</td>
<td>x 24</td>
</tr>
<tr>
<td>support of design</td>
<td></td>
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<tr>
<td>ideation</td>
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</tr>
<tr>
<td></td>
<td>[45]</td>
<td>x 4</td>
<td>x 10</td>
<td></td>
<td>x 1</td>
<td></td>
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<td>Category IT-</td>
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<tr>
<td>E:</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Produces two- or three-</td>
<td>[30]</td>
<td>x 2</td>
<td>x 2</td>
<td>x 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dimensional digital</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>images in response to</td>
<td>[60]</td>
<td>x 3</td>
<td></td>
<td></td>
<td>x 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a spatial design matter</td>
<td>[63]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x 1</td>
<td></td>
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<tr>
<td></td>
<td>[65]</td>
<td></td>
<td></td>
<td></td>
<td>x 1</td>
<td>x 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[66]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x 8</td>
</tr>
<tr>
<td>Category</td>
<td>Sub-category</td>
<td>Respondent 01</td>
<td>Respondent 07</td>
<td>Respondent 11</td>
<td>Respondent 03</td>
<td>Respondent 13</td>
<td>Respondent 05</td>
</tr>
<tr>
<td>---------------</td>
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<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td>IT-A: Uses paper-based ideation moves response to a spatial design matter</td>
<td>[4]</td>
<td>x 6</td>
<td>x 7</td>
<td>x 6</td>
<td>x 6</td>
<td>x 15</td>
<td>x 8</td>
</tr>
<tr>
<td></td>
<td>[6]</td>
<td>x 34 (including)</td>
<td>x 35 (including)</td>
<td>x 40 (including 1*)</td>
<td>x 6 (including 4*)</td>
<td>x 28 (including)</td>
<td>x 17 (including 8*)</td>
</tr>
</tbody>
</table>
Table 10 – Sub-categories within the category IT-A: Uses paper-based ideation moves response to a spatial design matter – sample 1

Five diagrams contain [31]: Produces and uses paper-based freehand plan sketches in response to a spatial design matter and [39]: Produces and uses paper-based freehand elevation sketches in response to a spatial design matter – see table 11.

<table>
<thead>
<tr>
<th>Category Sub-category</th>
<th>Respondent 01</th>
<th>Respondent 07</th>
<th>Respondent 11</th>
<th>Respondent 03</th>
<th>Respondent 13</th>
<th>Respondent 05</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT-A: Carries out paper-based ideation tools response to a spatial design matter</td>
<td>[31]</td>
<td>x 3 (including 2*)</td>
<td>x 2</td>
<td>x 14 (including 13*)</td>
<td>x 25 (including 19*)</td>
<td>x 8 (including 3*)</td>
</tr>
<tr>
<td>[39]</td>
<td>x 7</td>
<td>x 2 (including 2*)</td>
<td>x 2 (including 1*)</td>
<td>x 2</td>
<td>x 1</td>
<td></td>
</tr>
</tbody>
</table>

Table 11 – Sub-categories within the category IT-A: Uses paper-based ideation moves response to a spatial design matter – sample 2

Four contain [12]: Produces and uses collage to investigate design ideas and [32]: Produces and uses paper-based freehand section sketches in response to a spatial design matter – see table 12.

<table>
<thead>
<tr>
<th>Category Sub-category</th>
<th>Respondent 01</th>
<th>Respondent 07</th>
<th>Respondent 11</th>
<th>Respondent 03</th>
<th>Respondent 13</th>
<th>Respondent 05</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT-A: Carries out paper-based ideation tools response to a spatial design matter</td>
<td>[12]</td>
<td>x 1</td>
<td>x 3</td>
<td>x 5 (including 5*)</td>
<td>x 1</td>
<td></td>
</tr>
<tr>
<td>[32]</td>
<td>x 6</td>
<td>x 2 (including 2*)</td>
<td>x 2 (including 5*)</td>
<td>x 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 12 – Sub-categories within the category IT-A: Uses paper-based ideation

moves response to a spatial design matter – sample 3

Within the category IT-B: Carries out research in support of design ideation all the respondents’ diagrams contain [9]: Carries out supporting visuo-spatial research in connection with design ideation – see table 13.

<table>
<thead>
<tr>
<th>Category Sub-category</th>
<th>Respondent 01</th>
<th>Respondent 07</th>
<th>Respondent 11</th>
<th>Respondent 03</th>
<th>Respondent 13</th>
<th>Respondent 05</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT-B: Carries out research in support of design ideation</td>
<td>[09]</td>
<td>x 2</td>
<td>x 1</td>
<td>x 16 (including 1*)</td>
<td>x 8</td>
<td>x 5</td>
</tr>
</tbody>
</table>

Table 13 – Sub-categories within category IT-B: Carries out research in support of design ideation – sample 4

That said, table 9 also indicates considerable heterogeneity, indicating that no respondent evidenced the same range of sub-categories in their sketchbook material. Within the category IT-A: Uses paper-based ideation tools response to a spatial design matter only the diagrams of respondents 07 and 11 contain [12]: Produces and uses collage to investigate design ideas, [31]: Produces and uses paper-based freehand plan sketches in response to a spatial design matter, [40]: Produces and uses paper-based plan drawings, hand-drawn using a straight edge, in response to a spatial design matter, [73]: Produces and uses paper-based section drawings, hand-drawn using a straight edge, in response to a spatial design matter and [58]: Creates and uses painting/s experimentally in response to a spatial design matter – see table 14.

<table>
<thead>
<tr>
<th>Category Sub-category</th>
<th>Respondent 01</th>
<th>Respondent 07</th>
<th>Respondent 11</th>
<th>Respondent 03</th>
<th>Respondent 13</th>
<th>Respondent 05</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT-A: Carries out paper-based ideation tools response to a spatial</td>
<td>[40]</td>
<td>x 3</td>
<td>x 1</td>
<td>x 8</td>
<td>x 1</td>
<td>x 1</td>
</tr>
<tr>
<td></td>
<td>[41]</td>
<td>x 3</td>
<td>x 1</td>
<td>x 8</td>
<td>x 1</td>
<td>x 1</td>
</tr>
<tr>
<td></td>
<td>[42]</td>
<td>x 3</td>
<td>x 1</td>
<td>x 8 (including 6*)</td>
<td>x 1</td>
<td>x 1</td>
</tr>
<tr>
<td></td>
<td>[42]</td>
<td>x 3</td>
<td>x 1</td>
<td>x 8 (including 6*)</td>
<td>x 1</td>
<td>x 1</td>
</tr>
<tr>
<td></td>
<td>[58]</td>
<td>x 3</td>
<td>x 1</td>
<td>x 8</td>
<td>x 1</td>
<td>x 1</td>
</tr>
<tr>
<td></td>
<td>[73]</td>
<td>x 3</td>
<td>x 1</td>
<td>x 8</td>
<td>x 1</td>
<td>x 1</td>
</tr>
</tbody>
</table>
Table 14 – Sub-categories within category IT-A: Uses paper-based ideation

moves response to a spatial design matter – sample 5

Within the sub-category [45]: Carries out non-visuo-spatial research (eg: textual, auditory, interview based...) in connection with design ideation, and the categories IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter, IT-D [49]: Uses real materials in response to a spatial design matter and IT-G [56]: Produces one or more physical model/s in response to a spatial design matter the table shows further diversity – see table 15.

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-category</th>
<th>Respondent 01</th>
<th>Respondent 07</th>
<th>Respondent 11</th>
<th>Respondent 03</th>
<th>Respondent 13</th>
<th>Respondent 05</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT-B:</td>
<td>Carries out research in support of design ideation [45]</td>
<td>x 4</td>
<td>x 10 (including 2*)</td>
<td>x 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter [30]</td>
<td>x 2</td>
<td>x 2 (including 1*)</td>
<td>x 3</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>[60]</td>
<td>x 3</td>
<td>x 1</td>
<td>x 3</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>[63]</td>
<td>x 1</td>
<td>x 1</td>
<td></td>
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<tr>
<td></td>
<td>[65]</td>
<td>x 1</td>
<td>x 1</td>
<td>x 1</td>
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<td></td>
<td>[66]</td>
<td>x 8</td>
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<td></td>
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</tr>
<tr>
<td>IT-D [49]:</td>
<td>Uses real materials in response to a spatial design matter</td>
<td>x 2</td>
<td></td>
<td>x 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT-G [56]:</td>
<td>Produces one or more physical model/s in response to a spatial design matter</td>
<td>x 1</td>
<td>x 8</td>
<td>x 3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 15 – Sub-category [45]: Carries out non-visuo-spatial research (eg: textual, auditory, interview based...) in connection with design ideation, and categories IT-E:
This analysis indicates that the more closely the data is examined, the greater the degree of heterogeneity between respondents’ approaches to ideation becomes apparent. Some categories and sub-categories of ideational moves are shared, and these may have formed a basic ‘core’, but the overall range of categories and sub-categories varies considerably across the sample. This suggestion will be returned to below.

8.4.4 Enumeration of allocations of each category and sub-category

Having tabulated the categories, plus the sub-categories within their respective categories, I then analysed how many times each was allocated and compared the results across the sample. This indicated a wide variety. The category with the highest number of allocations across the sample is:

IT-A: Uses paper-based ideation tools response to a spatial design matter –
respondent 07: one-hundred-and-twenty-nine allocations

This category is always the one with the highest number of allocations within each diagram across the sample:

respondent 13: one-hundred allocations
respondent 11: ninety-one allocations
respondents 05 and respondent 01: forty-seven allocations
respondent 03: thirty-three allocations
However, the range of allocations of sub-categories within this category is comparatively diverse. The most-allocated across the sample is:

for all but respondent 07 [6]: *Produces and uses paper-based freehand perspective sketches in response to a spatial design matter*

for respondent 07 [33]: *Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter*

Moreover, occurrences of the sub-categories vary widely across the sample. For example:

[6]: *Produces and uses paper-based freehand perspective sketches in response to a spatial design matter:*

- respondent 11: **forty** times
- respondent 07: **thirty-five** times
- respondent 01: **thirty-four** times
- respondent 13: **twenty-eight** times
- respondent 05: **seventeen** times
- respondent 03: **six** times

[33]: *Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter:*

- respondent 07: **sixty** times
- respondent 11: **twenty-nine** times
- respondent 13: **eighteen** times
- respondent 05: **eleven** times
- respondent 01: **six** times
- respondent 03: **three** times
The category IT-C [22]: Produces and uses photographs in response to a spatial design matter also shows a comparatively diverse range of allocations:

respondent 11: seventy-seven times (the highest allocation of any category or sub-category for this respondent)
respondent 05: twenty-six times
respondent 03: twenty-two times
respondent 13: sixteen times
respondent 07: twelve times
respondent 01: eight times

In addition, respondent 05’s diagram contains twenty-four allocations of the sub-category [9]: Carries out supporting visuo-spatial research in connection with design ideation, and twenty-six allocations of the category IT-C [22]: Produces and uses photographs in response to a spatial design matter, which, in combination, are more than the allocation of sub-categories within IT-A: Uses paper-based ideation tools response to a spatial design matter.

The figures listed above reveal the respondents’ approaches to design ideation to be more heterogeneous and unpredictable the more fine-grained the analysis. This suggests that each respondent within the sample was making different choices from the ideational moves available, in some cases markedly so. This suggestion will be returned to below.

8.4.5 Analysis of connectedness of categories and sub-categories of ideational move

Having carried out the above analysis, my next task was to identify which respondent across the sample evidenced the highest degree of connectedness, which the next highest, and so on down to the lowest. This I did in the understanding that connectedness is a relative matter: high and low are not absolute terms, and phrases such as ‘second highest’ and ‘third-lowest’
are particular to my study. In order to rank the respondents, I represented diagrammatically how the approaches of each compared in terms of their connectedness. The resultant diagrams are too numerous to be shown clearly in this thesis, so a sample is provided in figure 30, and further samples in Appendix M.
Figure 30 – Sample of diagrams showing connectedness of categories and sub-categories
I then sought to ascertain the overall quantity of connections between ideational moves shown in each diagram. I noted in section 8.4.2 Enumeration of sub-categories contained within categories, plus categories that do not contain sub-categories that:

respondent 07’s diagram contains eighteen sub-categories and categories that do not contain sub-categories overall (the highest)
respondent 11’s sixteen (the second-highest)
respondent 13’s thirteen (the third-highest)
respondent 05’s twelve (the third-lowest)
respondent 03’s ten (the second-lowest)
respondent 01’s seven (the lowest)

On commencement of the analysis of the connectedness of sub-categories and categories that do not contain sub-categories, I had speculated on whether a similar ranking order might be revealed. However, this was not the case:

respondent 11 – seventy-six connections overall (highest)
respondent 13 – sixty-three connections overall (the second-highest)
respondent 07 – forty connections overall (the third-highest)
respondent 03 – thirty-six connections overall (the third-lowest)
respondent 05 – fourteen connections overall (the second-lowest)
respondent 01 – ten connections overall (lowest)

This I followed with the analysis of the connectedness of each sub-category and category that does not contain sub-category. The results I have tabulated as follows: table 16 shows the most highly-connected ideational moves across the sample and table 17 shows the most poorly-connected ideational moves. Appendix O shows those those ideational moves not tabulated here because of limited space.
<p>| 11 | [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter | IT-A: Uses paper-based ideation tools response to a spatial design matter | Thirty-one | Highest | Fourteen connections are to other sub-categories that, like [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter, are within category IT-A: Uses paper-based ideation tools response to a spatial design matter; eight are to category IT-C [22]: Produces and uses photographs in response to a spatial design matter; seven to category IT-B: Carries out research in support of design ideation; and two are to sub-categories within category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter |
| 11 | IT-C [22]: Produces and uses photographs in response to a spatial design matter | Twenty-nine | Second-highest | Fourteen connections are to sub-categories within category IT-A: Uses paper-based ideation tools response to a spatial design matter; eleven to category IT-B: Carries out research in support of design ideation; and four to sub-categories within category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter |
| 11 | [45]: Carries out non-visuo-spatial research (eg: textual, auditory, interview) | IT-B: Carries out research in support of design ideation | Nineteen | Joint-third-highest | Eleven connections are to sub-categories within category IT-A: Uses paper-based ideation tools response to a spatial design matter |</p>
<table>
<thead>
<tr>
<th>#</th>
<th>Category</th>
<th>Description</th>
<th>Joint-Third-Highest</th>
<th>Fifth-Highest</th>
<th>Sixth-Highest</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
<td>Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter</td>
<td>Fourteen connections are to sub-categories within category IT-A: Uses paper-based ideation tools response to a spatial design matter; two to category IT-C [22]: Produces and uses photographs in response to a spatial design matter; three to sub-category [9]: Carries out supporting visuo-spatial research in connection with design ideation; and one to sub-category within category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
<td>Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter</td>
<td>Sixteen connections are to sub-categories within category IT-A: Uses paper-based ideation tools response to a spatial design matter, and one to sub-category within category IT-B: Carries out research in support of design ideation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
<td>Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter</td>
<td>Nine connections are to sub-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT-A: Uses paper-based ideation tools response to a spatial design matter; four are to sub-categories within category IT-A</td>
<td>Based on paper-based ideation tools response to a spatial design matter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[32]: Produces and uses paper-based freehand section sketches in response to a spatial design matter</td>
<td>IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fifteen Seventeenth highest</td>
<td>Nine connections are to sub-categories within category IT-A: Uses paper-based ideation tools response to a spatial design matter; three to sub-categories within category IT-B: Carries out research in support of design ideation; and three to sub-categories within category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[9]: Carries out supporting visuo-spatial research in connection with design ideation</td>
<td>IT-B: Carries out research in support of design ideation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thirteen Eighth-highest</td>
<td>Three connections are to two sub-categories within category IT-A: Uses paper-based ideation tools response to a spatial design matter; two to one sub-category within category IT-A: Uses paper-based ideation tools response to a spatial design matter; four to category IT-C [22]: Produces and uses photographs in response to a spatial design matter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>[9]: Carries out supporting visuo-spatial research in connection with design ideation</td>
<td>IT-B: Carries out research in support of design ideation</td>
<td>Twelve</td>
<td>Joint-ninth-highest</td>
<td>Eight connections are to sub-categories within category IT-A: Uses paper-based ideation tools response to a spatial design matter; three to category IT-C [22]: Produces and uses photographs in response to a spatial design matter; and one to category IT-D [49]: Uses real materials in response to a spatial design matter</td>
</tr>
<tr>
<td>03</td>
<td>IT-C [22]: Produces and uses photographs in response to a spatial design matter</td>
<td>Twelve</td>
<td>Joint-ninth-highest</td>
<td>Seven connections are to sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter; four to the sub-category [9]: Carries out supporting visuo-spatial research in connection with design ideation; and one to a sub-category within category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>[6]: Produces and uses paper-</td>
<td>IT-A: Uses paper-</td>
<td>Twelve</td>
<td>Joint ninth-highest</td>
<td>Eleven connections are to sub-</td>
</tr>
<tr>
<td>Rank</td>
<td>Category</td>
<td>Description</td>
<td>高楼 196</td>
<td>Tenth-highest</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
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<td>-------------</td>
<td>---------</td>
<td>---------------</td>
<td>-------------</td>
</tr>
<tr>
<td>13</td>
<td>IT-C [22]: Produces and uses photographs in response to a spatial design matter</td>
<td>Eleven</td>
<td>Tenth-highest</td>
<td>Eight connections are to sub-categories within category IT-A: Uses paper-based ideation tools response to a spatial design matter; three to a sub-category within category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter; and one to a sub-category within category IT-B: Carries out research in support of design ideation.</td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
<td>Ten</td>
<td>Eleventh-highest</td>
<td>Nine connections are to sub-categories within category IT-A: Uses paper-based ideation tools response to a spatial design matter; two to a sub-category within category IT-B: Carries out research in support of design ideation; and one to category IT-C [22]: Produces and uses photographs in response to a spatial design matter.</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>[9]: Carries out supporting visuo-spatial research in connection with design ideation</td>
<td>Nine</td>
<td>Twelfth-highest</td>
<td>Eight connections are to sub-categories within category IT-A: Uses paper-based ideation tools response to a spatial design matter; and one to category IT-C [22]: Produces and uses photographs in response to a spatial design matter.</td>
<td></td>
</tr>
<tr>
<td>Respondent</td>
<td>Sub-category</td>
<td>Category</td>
<td>Total number of connections</td>
<td>Level of connectedness across sample</td>
<td>Notes</td>
</tr>
<tr>
<td>------------</td>
<td>--------------</td>
<td>----------</td>
<td>----------------------------</td>
<td>-------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>01</td>
<td>[9]: Carries out supporting visuo-spatial research in connection with design ideation</td>
<td>IT-B: Carries out research in support of design ideation</td>
<td>Two</td>
<td>Joint-nineteenth-highest</td>
<td>Both connections are to sub-categories within category IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
</tr>
<tr>
<td>07</td>
<td>[30]: Uses CAD software to produce 3D drawings in response to a spatial design matter</td>
<td>IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter</td>
<td>Two</td>
<td>Joint-nineteenth-highest</td>
<td>Both connections are to sub-categories within category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter</td>
</tr>
<tr>
<td>07</td>
<td>[60]: Uses CAD software to produce plan in response to a spatial design matter</td>
<td>IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter</td>
<td>Two</td>
<td>Joint-nineteenth-highest</td>
<td>Both of connections are to sub-categories within category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter</td>
</tr>
<tr>
<td>11</td>
<td>[31]: Produces and uses paper-based freehand plan sketches in response to a spatial design matter</td>
<td>IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
<td>Two</td>
<td>Joint-nineteenth-highest</td>
<td>One connection is to a sub-category within category IT-A: Uses paper-based ideation tools response to a spatial design matter, and one to a sub-category within category IT-B: Carries out research in support of design ideation</td>
</tr>
<tr>
<td>11</td>
<td>39]: Produces and uses paper-based freehand elevation sketches in response to a spatial design matter</td>
<td>IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
<td>Two</td>
<td>Joint-nineteenth-highest</td>
<td>One connection is to category IT-C [22]: Produces and uses photographs in response to a spatial design matter, and one to a sub-category within category IT-B: Carries out research in support of design ideation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
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<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>[60]: Uses CAD software to produce plan in response to a spatial design matter</td>
<td>IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter</td>
<td>Two</td>
<td>Joint-nineteenth-highest</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Both connections are to a sub-category within category IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>[12]: Produces and uses collage to investigate design ideas</td>
<td>IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
<td>Two</td>
<td>Joint-nineteenth-highest</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>One connection is to category IT-C [22]: Produces and uses photographs in response to a spatial design matter, and one to a sub-category within category IT-B: Carries out research in support of design ideation</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>[58]: Creates and uses painting/s experimentally in response to a spatial design matter</td>
<td>IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
<td>Two</td>
<td>Joint-nineteenth-highest</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>One connection is to category IT-C [22]: Produces and uses photographs in response to a spatial design matter, and one to a sub-category within category IT-B: Carries out research in support of design ideation</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>[33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter</td>
<td>IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
<td>Two</td>
<td>Joint-nineteenth-highest</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>One connection is to a sub-category within category IT-A: Uses paper-based ideation tools response to a spatial design matter; and one to a sub-category within category IT-B: Carries out research in support of design ideation</td>
<td></td>
</tr>
<tr>
<td>01</td>
<td>[12]: Produces and uses collage to investigate design ideas</td>
<td>IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
<td>One</td>
<td>Joint-twentieth-highest</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>This is connected to a sub-category within category IT-B: Carries out research in support of design ideation</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>[73]: Produces and uses paper-based section drawings, hand-drawn using a straight edge,</td>
<td>IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
<td>One</td>
<td>Joint-twentieth-highest</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>This is connected to a sub-category within category IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
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<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>07</td>
<td>[65]: Uses CAD software to produce section drawings to in response to a spatial design matter</td>
<td>IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter</td>
<td>One</td>
<td>Joint-twentieth-highest</td>
<td>This connection is to a sub-category within category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter</td>
</tr>
<tr>
<td>11</td>
<td>[40]: Produces and uses paper-based plan drawings, hand-drawn using a straight edge, in response to a spatial design matter</td>
<td>IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
<td>One</td>
<td>Joint-twentieth-highest</td>
<td>This connection is to a sub-category within category IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
</tr>
<tr>
<td>03</td>
<td>[45]: Carries out non-visuo-spatial research (eg: textual, auditory, interview based...) in connection with design ideation</td>
<td>IT-B: Carries out research in support of design ideation</td>
<td>One</td>
<td>Joint-twentieth-highest</td>
<td>This connection is to a sub-category within category IT-B: Carries out research in support of design ideation</td>
</tr>
<tr>
<td>05</td>
<td>[12]: Produces and uses collage to investigate design ideas</td>
<td>IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
<td>One</td>
<td>Joint-twentieth-highest</td>
<td>This connection is to a sub-category within category IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
</tr>
<tr>
<td>05</td>
<td>[4]: Uses a word-based approach in response to a spatial design matter</td>
<td>IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
<td>One</td>
<td>Joint-twentieth-highest</td>
<td>This connection is to a sub-category within category IT-B: Carries out research in support of design ideation</td>
</tr>
<tr>
<td>05</td>
<td>IT-D [49]: Uses real materials in response to a spatial design matter</td>
<td>One</td>
<td>Joint-twentieth-highest</td>
<td>This connection is to a sub-category within category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>IT-G [56]: Produces one or more physical</td>
<td>Zero</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 17 – Most poorly-connected ideational moves across the sample

<table>
<thead>
<tr>
<th></th>
<th>ideational move</th>
<th>IT-A: Uses paper-based ideation tools response to a spatial design matter</th>
<th>IT-B: Carries out research in support of design ideation</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Produces and uses collage to investigate design ideas</td>
<td>0</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>05</td>
<td>Produces and uses paper-based freehand elevation sketches in response to a spatial design matter</td>
<td>0</td>
<td></td>
<td>N/A</td>
</tr>
</tbody>
</table>

These results appear to show a degree of heterogeneity across the sample, in that the total number of connections ranges from thirty-one to five, but it should also be noted that sub-categories within the categories IT-A: Uses paper-based ideation tools response to a spatial design matter and IT-B: Carries out research in support of design ideation all show high
connectivity; the category IT-C [22]: Produces and uses photographs in response to a spatial design matter was highly connected in only a comparatively small number of cases across the sample; and no other category was highly connected.

The analysis indicates heterogeneity in certain other ways. Firstly, for respondents 07, 11, 03 and 13, the connectedness of the sub-category [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter was found to be comparatively high, whilst for respondents 01 and 05 it was comparatively low; for respondents 03 and 05 the connectedness of the sub-category [9]: Carries out supporting visuo-spatial research in connection with design ideation was found to be comparatively high, whilst for respondent 13 it was less high and for respondents 07 and 01 comparatively low; for respondent 13 the connectedness of the sub-category [32]: Produces and uses paper-based freehand section sketches in response to a spatial design matter was found to be comparatively high, whilst for respondent 11 it was comparatively low.

Secondly, respondents 11 and 05 appear to have been choosing to use, in combination, a comparatively small range of ideational moves drawn from a much larger toolkit, whilst respondents 07, 13, 03 and 01, appear to have been using the toolkits available to them more widely – see table 18.

<table>
<thead>
<tr>
<th>Respondent</th>
<th>Overall level of connectedness across the sample</th>
<th>Other observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Highest</td>
<td>Comparatively large number of categories and sub-categories with low connectedness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Comparatively large gap between the highly connected categories and sub-categories and the poorly connected ones</td>
</tr>
<tr>
<td>13</td>
<td>Second highest</td>
<td>No comparatively large gap between the highly connected categories and sub-categories and the less highly connected ones, and comparatively fewer of the latter</td>
</tr>
<tr>
<td>07</td>
<td>Third highest</td>
<td>Comparatively large number of categories and sub-categories with low connectedness and no comparatively large gap between the highly connected categories and sub-categories and the poorly connected ones</td>
</tr>
<tr>
<td>03</td>
<td>Fourth highest</td>
<td>Comparatively few poorly connected categories and sub-categories, and no comparatively large gap between the highly connected categories and sub-categories and the less highly connected ones</td>
</tr>
<tr>
<td>05</td>
<td>Joint lowest level</td>
<td>Comparatively large number of categories and sub-categories with low connectedness, plus a comparatively large gap between the</td>
</tr>
</tbody>
</table>
Table 18 – Categories/sub-categories with diverse connections

| 01 | Joint lowest level | In contrast to the diagrams for respondents 11 and 05, but in common with those for respondents 13, 03 and 07 respondent 01’s diagram does not illustrate a comparatively large gap between the highly connected categories and sub-categories and the poorly connected ones |

Thirdly, I began this study suspecting students preferred to use word-based rather than image-based methodologies, but the above results reveal that the connectedness of [4]: Uses a word-based approach in response to a spatial design matter was comparatively low for respondents 03 and 07, lower for respondent 01, and even lower for respondent 05.

Fourthly, I began this study suspecting students preferred to use digital rather than paper-based means of creating and manipulating images, and found support for this during the literature review. Notwithstanding this, the diagrams indicate the connectedness of sub-categories within the category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter was comparatively low for all respondents.

Fifthly, table 17 shows certain categories and sub-categories with zero connections. The sub-categories are all within the category IT-A: Uses paper-based ideation tools response to a spatial design matter, suggesting that, across the sample, this is the least connected: an interesting finding, because, as was noted above, sub-categories within this category are also the most connected. Furthermore, of the unconnected categories, IT-G [56]: Produces one or more physical model/s in response to a spatial design matter denotes an apparently unconnected group of physical models discussed by respondent 07. This contrasts with respondent 11’s and 13’s more connected use of model-making, but it should be noted that respondents 01, 03 and 05 did not evidence model-making at all during their interviews.
8.5 Ideational moves – analysis of ‘timeline’ diagrams

8.5.1 Categories and sub-categories – possible repeated patterns

In this study, I did not require a pattern necessarily to be a lengthy sequence of exactly-replicated categories and/or sub-categories. It might instead consist of shorter, more loose, more fleeting combinations which occur more than once. Several possible instances of these have been identified. Those I regard as most significant (because they appear to indicate certain contrasting approaches to design ideation) are discussed below; others are included in Appendix K.

Respondent 01’s diagram reveals that one sub-category within the category IT-A: *Uses paper-based ideation tools response to a spatial design matter* occurs quite frequently in the early stage of the interview, and also (after a period of absence) towards the end: [4]: *Uses a word-based approach in response to a spatial design matter*. Although within this diagram the sub-category [6]: *Produces and uses paper-based freehand perspective sketches in response to a spatial design matter* occurs most frequently it does so in four big allocations whilst [4]: *Uses a word-based approach in response to a spatial design matter* is interspersed throughout the interview.
Figure 31 – Repeated patterns of category and sub-category allocation – respondent 01
Like respondent 01’s diagram, respondent 07’s also suggests one sub-category within IT-A: 
Uses paper-based ideation tools response to a spatial design matter may be particularly
important. In this case, it is [33]: Produces and uses paper-based freehand sketch diagrams
in response to a spatial design matter, which occurs thirteen times within the diagram (more
than any other category or sub-category) and is interspersed throughout it, sometimes in
large allocations and sometimes not, mostly connected but sometimes not. It may therefore
be argued that [33]: Produces and uses paper-based freehand sketch diagrams in response
to a spatial design matter played a key role in this respondent’s approach to design ideation.
Figure 32 – Repeated patterns of category and sub-category allocation – respondent 07
In contrast to those of respondents 01 and 07, respondent 11’s diagram contains evidence of several possible patterns of ideational moves. Sub-categories within the category IT-B: Carries out research in support of design ideation occur comparatively frequently early on (where they combine with certain sub-categories within IT-A: Uses paper-based ideation tools response to a spatial design matter) and also approximately fourth-fifths of the way into the diagram (where they do not combine in this way). Also, after approximately one-fifth of the way into the diagram, the category IT-C [22]: Produces and uses photographs in response to a spatial design matter occurs comparatively frequently – often after every page turn – either connected to a sub-category within the category IT-A: Uses paper-based ideation tools response to a spatial design matter, or else apparently unconnected. These data suggest that, unlike the diagrams of respondents 01 and 07, respondent 11’s reveals several subtly shifting combinations as a comparatively small number of categories and sub-categories come together, separate and form different combinations in a relatively fluid manner.
Figure 33 – Repeated patterns of category and sub-category allocation – respondent 11
Near its beginning, respondent 03’s diagram contains evidence of a pattern comprising the category IT-C [22]: Produces and uses photographs in response to a spatial design matter connected to the sub-category [9]: Carries out supporting visuo-spatial research in connection with design ideation and one or more sub-categories within IT-A: Uses paper-based ideation tools response to a spatial design matter. Towards the middle of the diagram, further sub-categories within IT-A: Uses paper-based ideation tools response to a spatial design matter appear to play a key role in the respondent’s sketchbook material (sometimes connected to other sub-categories within the category, sometimes unconnected). In the latter part of the diagram, sub-categories within IT-B: Carries out research in support of design ideation appear to play a key role connected to sub-categories within IT-A: Uses paper-based ideation tools response to a spatial design matter. This suggests that, unlike the diagrams of respondents 01 and 07, but like respondent 11’s, respondent 03’s diagram reveals an array of subtly shifting combinations as categories and sub-categories come together, separate and form different combinations. Also interesting, perhaps, is that, early on in the diagram, respondent 03 appears to have worked in a more connected way than any other respondent across the sample with categories and sub-categories connected in groups of three, four and five.
Figure 34 – Repeated patterns of category and sub-category allocation – respondent 03
In the second and third fifths of respondent 13’s diagram, the category IT-C [22]: Produces and uses photographs in response to a spatial design matter (often connected to [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter and IT-G [56]: Produces one or more physical model/s in response to a spatial design matter) occurs five times. From the second fifth of the diagram onwards [33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter occurs comparatively frequently, often connected to sub-categories within IT-A: Uses paper-based ideation tools response to a spatial design matter.
Figure 35 – Repeated patterns of category and sub-category allocation – respondent 13
Respondent 05’s diagram suggests sub-category [9]: Carries out supporting visuo-spatial research in connection with design ideation may have provided an underlying structure during much – although not all – of the video-recording of the interview, because it is allocated on almost every page and is therefore repeated frequently. This possible pattern is interspersed by three large allocations of the category IT-C [22]: Produces and uses photographs in response to a spatial design matter during the early stage of the diagram and then followed later on by several sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter.
Respondent 05

Used in conjunction with oral-professional text (not discussed during the interview).

Tabled twice in conjunction with photographs of people demanding meals, but says little about it. It may be connected to that research, but I cannot be sure.

Possibly used in conjunction with cinema plans, film, and then a show. The plans to show the sort of, circulation, parts and...

Video recording of this part of the interview available.

Now rolo's trains take any life... I think. Old gамиа sounds, and photography... it's an, something might... given more... and... what the... old... is using numerical... can... that what's called, something... "do..."..."you, Wiseman"... "hush..."...
Figure 36 – Repeated patterns of category and sub-category allocation – respondent 05
Finally, whilst in respondent 07’s diagram ideational moves concerning *IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter* occur on three separate occasions dispersed throughout, in respondent 11’s they occur on two occasions once near the beginning and once near the end; in those of respondent 03, 13 and 05 they occur once, either in the first quarter of the diagram (in the case of respondent 03), in the final fifth of the diagram (in the case of respondent 13) or in the latter stage (in the case of respondent 05).

If the categories, sub-categories and connectedness, as represented in the ‘synoptic’ diagrams analysed above, reveal heterogeneous approaches to design ideation, the beginnings and ends of the ‘timeline’ diagrams do too – see **tables 19 and 20**.

<table>
<thead>
<tr>
<th>Respondent</th>
<th>Diagram begins with…</th>
<th>Category</th>
<th>Sub-category</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
<td>[4]: Uses a word-based approach in response to a spatial design matter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
<td>[4]: Uses a word-based approach in response to a spatial design matter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>IT-C [22]: Produces and uses photographs in response to a spatial design matter</td>
<td>[33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter</td>
<td>Connected to the sub-categories [4]: Uses a word-based approach in response to a spatial design matter and [45]: Carries out non-visuo-spatial research (eg: textual, auditory, interview based…) in connection with design ideation</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>IT-A: Uses paper-based ideation tools response to a spatial design matter</td>
<td>[6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>IT-B: Carries out research in support of design ideation</td>
<td>[9]: Carries out supporting visuo-spatial research in connection with design ideation and [39]: Produces and uses paper-based freehand elevation sketches in response to a spatial design matter used connectedly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>IT-A: Uses paper-based ideation tools response to a spatial design</td>
<td>[12]: Produces and uses collage to investigate design ideas</td>
<td>Used connectedly</td>
<td></td>
</tr>
</tbody>
</table>
Table 19 – ‘Timeline’ diagram beginnings

<table>
<thead>
<tr>
<th>Respondent</th>
<th>Diagram ends with...</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>A group of connected sub-categories (mostly within IT-A: Uses paper-based ideation tools response to a spatial design matter) and the category IT-D [49]: Uses real materials in response to a spatial design matter followed by a sequence of discursive moves</td>
</tr>
<tr>
<td>11</td>
<td>An unconnected sub-category, [33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter, followed by one discursive move</td>
</tr>
<tr>
<td>03</td>
<td>An unconnected sub-category, [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter, and [9]: Carries out supporting visuo-spatial research in connection with design ideation used connectedly followed by a series of discursive moves</td>
</tr>
<tr>
<td>13</td>
<td>An unconnected sub-category, [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter, followed by two discursive moves</td>
</tr>
<tr>
<td>07</td>
<td>An unconnected category, IT-G [56]: Produces one or more physical model/s in response to a spatial design matter followed by a series of discursive moves</td>
</tr>
<tr>
<td>05</td>
<td>An unconnected sub-category, [65]: Uses CAD software to produce section drawings to in response to a spatial design matter, followed by a comparatively lengthy series of discursive moves</td>
</tr>
</tbody>
</table>

Table 20 – ‘Timeline’ diagram endings
8.6 Discursive moves – analysis of ‘timeline’ diagrams

In section 1.7 ‘Discursive moves’, I define these as revealing the respondent seeking to influence the course of the interview by making one or more unprompted interventions, and I note that these interventions may be physical, spoken or in the form of annotations to sketchbook material. In the current section I explore the theoretical underpinning of this component of my study, beginning with the physical interventions. Are these body language? I suspect many, if not all, of them may be closer to what McNeil et al term ‘speech-synchronised gestures’ (McNeil et al, 2015, p. 1): parts of speech, and integral to spoken communication.

Clarke (2003) provides a number of helpful insights into two physical interventions that are relevant to my study: pointing and placing. He notes that the former is frequently regarded as ‘the only way to anchor communication...’ (Clarke, 2003, p. 243) but he refutes this, describing how, in a drugstore, by carrying out a number of acts of placement – locating himself in front of the shop assistant, positioning on the counter two items he wishes to purchase, referring to them using the spoken word, but not pointing – he established different anchors (Clarke, 2003). Pointing is well-recognised as a communicative act, but Clarke argues that placement should be too (ibid.). Both are types of index: indicating a thing, essentially, means creating an index for it. Indexes are one of three kinds of sign, along with icons, symbols (ibid.):

‘When I ...[say] ‘I have a dog,’ I am producing dog as a symbol to signify a category of things. When I demonstrate a pear by drawing its shape in the air, I am producing an icon to signify a pear. And when I indicate my car by pointing at it, I am creating an index to that particular car.’ (Clarke, 2003, p. 245)

Describing, demonstrating and indicating are methods, not types, of signalling. Indicating requires that an ‘intrinsic connection’ (Clarke, 2003, p. 246) is made between an object and the signal. This may be achieved, inter alia, by pointing at something or placing it in an appropriate location.
Pointing and placement are essential components of two indicating techniques: ‘…directing-to and placing-for…’ (Clarke, 2003, p. 244) These are ‘…social engineering. Speakers arrange for their addressees to locate and focus attention on a particular object, relying on intrinsic spatial connections between the index and object.’ (Clarke, 2003, p. 247) Pointing and placing manifest key differences:

‘In pointing, speakers try to direct their addressees’ attention to the object they are indicating…In placing, speakers try to place the object they are indicating so that it falls within the addressees’ focus of attention…In directing-to, speakers try to move the addressees’ attention to the object. In placing-for, they try to move the object into the addressees’ attention…The two techniques contrast on what speakers try to manipulate: the addressees’ attention, or the object of the indication.’ (Clarke, 2003, p. 248)

These methods only work if the human actors perceive there to be a ‘nonarbitrary link’ (ibid.) between the means of indication and the object – ie: if pointing at or placing the object are understood as ways of indicating it. Indicating also requires that the object is interpreted in a particular way – thus, ‘[w]hen…I pointed at a nearby car, I was indicating the thing I was pointing at as ‘a car,’ not as ‘a piece of junk’ or as ‘a good example of modern technology.’ (ibid.) This, Clarke argues, is the interpretant: ‘[t]he index is my pointing; the object is my car; and for…[the other person] and me, the interpretant is ‘a car.”’ (Clarke, 2003, p. 246)

How does Clarke’s paper impact on my study? When they gestured towards a specific item or collection of items of sketchbook material (see figures 20 to 22 inclusive) I regard my respondents as having evidenced directing-to: they were attempting to make, and expecting me to make, a nonarbitrary link between their pointed finger or hand (the video-recordings reveal both being used on different occasions) and the sketchbook material; the pointing gesture was the index, the sketchbook material was the object, ‘one or more items of sketchbook material’ was the interpretant, and the respondent’s intention was to direct my
attention to the object. Moreover, I regard my respondents’ page-turning moves as, in effect, types of placing-for: by turning a page, they were attempting to make, and expecting me to make, a nonarbitrary link between my attention and their newly revealed sketchbook material; the page-turning was the index, the newly-revealed sketchbook material was the object, the interpretant was ‘a page of sketchbook material’, and the respondent’s intention was to place that new page for my attention. That said, Clarke's examples are not taken from an interview context and thus do not mirror many of the instances of directing-to and placing-for encountered in my study. When he describes a woman asking, whilst they are both in a car park, ‘Which car is yours?’ (Clarke, 2003, p. 246), and himself pointing to his car, this appears to be what I have termed a prompted move. But what if he pointed without being questioned, or owned all the cars in the car park but only pointed to one? What if the woman was doing the pointing instead of him? In these cases, it is possible Clarke and the woman would not share the same interpretant. She may understand his gesture as, ‘That is a car,’ whilst he may actually mean, ‘That is an indication of my wealth.’ He may understand her gesture as ‘That is a car,’ whilst she may actually mean ‘That is a piece of junk.’ Such moves would mirror the occasions during my study when the respondents pointed to sketchbook material without being prompted and/or pointed to one item out of several on the page, and when I pointed to the respondents’ sketchbook material. Furthermore, when Clarke places items on the drug store counter, he wants to buy them both and he expects the shop assistant to understand that. But what if he wanted to buy only one of the two items, or placed both there for another reason? What if the shop assistant moved one of the items out of sight, or added an other item? In these cases, it is possible Clarke and the shop assistant would not share the same interpretant. The shop assistant may understand Clarke’s placement as, ‘Items to be purchased,’ whilst he might actually mean, ‘Items to be left for later.’ Clarke may understand the shop assistant’s placement as, consecutively, ‘Item that is not for sale,’ or ‘Free item,’ whilst the shop assistant might actually mean, ‘Item to be wrapped,’ or ‘Cheaper alternative.’

I have noted in this thesis that I was not sure whether certain gestures were pointing moves or not (see figures 23 to 25 inclusive). Mittelberg and Waugh’s (2014) consideration of
pointing as metonymy offers helpful insights here. If I use my hand to make the shape of a telephone and place it against my ear in order to indicate to someone that I am going to call her, or use my hand to imitate drinking from a mug in order to enquire whether she wants a coffee, I am making metonymic gestures: ‘partial representations’ (Mittelberg and Waugh, 2014, p. 1747) that ‘…can be understood without additional speech information…’ (Mittelberg and Waugh, 2014, p. 1748) It may be thought that a pointing gesture is not mimetic in the way that pretending to drink from a mug is, but Mittelberg and Waugh note that using the hand or finger to point to, or hover over or near, an object involves ‘…external relations between hands and the objects…and surfaces they are in touch with that may be highlighted, established, or deleted through metonymic modes operating on them.’ (Mittelberg and Waugh, 2014, pp. 1755) Furthermore, Mittelberg and Waugh describe pointing as ‘…body-centered ‘metonymic proximity’…’ (ibid.) and offer a typology of metonymic gestures that draw attention to rather than seek to represent an object, and – overlapping with Clarke’s (2003) paper – are described, not as iconic but as indexical. This includes:

‘AWAY FROM BODY INDEX (POINTING)’ (ibid.): pointing gestures ‘…as examples of prototypical or highly indexical signs based on an outer contiguity relation between the tip of the pointing finger or hand and the more or less distant target…’ (ibid.)

‘PLACING INDEX’ (ibid.): the placement, inter alia, of ‘…things…referred to in speech in gesture space, thus creating placeholders that either underpin the introduction of a new discourse element or facilitate anaphoric reference. Placing may be performed with one…or both hands, but typically with the palm facing down…or away from the body. A speaker might also simply point with…[the] index finger into the space in front of him [or her], thus setting up a point or location that metonymically stands for something else…’ (ibid.) I wonder if, when during an interview a respondent’s hand hovered over a page of sketchbook material or gestured towards it without appearing to select a particular item of work, this was a demonstration of placing indexing: the gesture was metonymically standing for the sketchbook material, or an unidentified item of it?
Such metonymic gestures are abstractions in that they are ‘...the singling out of salient features or decisive moments of entities, ideas, actions, or events...’ (Mittelberg and Waugh, 2014, p. 1747) This notion of abstraction informs my definition of discursive moves by enabling me to conceptualise how my respondents used unprompted pointing and placement during their interviews: I deem it as likely that they were abstracting from the sketchbook material in order to direct my attention to salient features or decisive moments. I asked above what would happen if Clarke owned all the cars in the car park but only pointed to one of them. This would also be an abstraction giving his enquirer a partial answer to her question, just as making the shape of a telephone using the hand is not making a telephone, it is metonymic. In a similar manner, when my respondents pointed selectively and page-turned without prompting during their accounts of their sketchbook material, I deem it as likely that they were not attempting portray not the ‘real’ thing but a metonymic version of it.

I mentioned above that I have defined discursive moves as including interventions that were physical, spoken, and in the form of annotations to sketchbook material. Having addressed physical interventions, I now need to account for why I regard the spoken word (for example, the respondent appearing to answer questions I had not asked, not to answer questions I had asked, or provide an overview of their methodology) and annotations to the sketchbook material (for example, hand-written statements indicating missing work to be added at a later date) as being similar. My argument is that such moves show the respondent singling out salient features by attempting to direct attention away from the sketchbook material being tabled onto a particular matter, and thus making an abstraction. Furthermore, a written note stating what is missing from the sketchbook material is not the same as the missing item, it is a symbol for it, a metonymic version of it.

8.6.1 Enumerating categories, sub-categories within categories, and moves within sub-categories and categories

8.6.1.1 Category-level analysis

An examination of the ‘timeline’ diagrams at a category-level reveals that the range of
discursive moves varies across the sample from three for respondent 03 to seven for respondent 05 with, in between these extremes, six for respondent 07, and four for respondents 01, 11 and 13. As Table 21 shows, all the diagrams include IM-T: Carries out a move during the interview without apparent encouragement from the interviewer and IM-W [38]: Evaluates his/her design process in an overview. The diagrams of respondents 03, 05, 07, 11 and 13 include IM-Y [7]: Appears to be using dismissive words and phrases to describe his/her design ideation tools, and those of respondents 01, 05, 07, 11 and 13 include IM-V: Mentions being guided by internal/external educational experiences. This analysis suggests a high degree of homogeneity at category-level across the sample. However, the diagrams of respondents 01, 05 and 07 also share IM-U [13]: Mentions experiencing a design insight through his/her ideation activities, those of respondents 05 and 07 the category IM-X [70]: Presents his/her ideation work using multiple platforms, and only that of respondent 05 shows IM-Z [75]: Respondent indicates having a different understanding of the meaning of design than I have. This suggests that beyond the category-level homogeneity identified there may also a significant degree of heterogeneity.

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-category</th>
<th>Respondent 01</th>
<th>Respondent 07</th>
<th>Respondent 11</th>
<th>Respondent 03</th>
<th>Respondent 13</th>
<th>Respondent 05</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM-T: Carries out a move during the interview without apparent encouragement from the interviewer</td>
<td>[68]</td>
<td>x 7</td>
<td>x 41</td>
<td>x 85</td>
<td>x 25</td>
<td>x 56</td>
<td>x 61</td>
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<td>[71]</td>
<td>x 3</td>
<td>x 12</td>
<td>x 56</td>
<td>x 19</td>
<td>x 69</td>
<td>x 16</td>
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<td>[72]</td>
<td>x 5</td>
<td>x 10</td>
<td>x 5</td>
<td>x 5</td>
<td>x 5</td>
<td>x 12</td>
</tr>
<tr>
<td>IM-U [13]: Mentions experiencing a design insight through his/her ideation activities</td>
<td>[13]</td>
<td>x 11</td>
<td>x 2</td>
<td>x 21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IM-V: Mentions being guided by internal/external educational experiences</td>
<td>[5]</td>
<td>x 4</td>
<td>x 4</td>
<td>x 1</td>
<td>x 1</td>
<td>x 1</td>
<td>x 1</td>
</tr>
<tr>
<td>IM-W [38]: Evaluates his/her design process in an overview</td>
<td>[29]</td>
<td>x 1</td>
<td>x 2</td>
<td>x 3</td>
<td>x 1</td>
<td>x 2</td>
<td>x 15</td>
</tr>
<tr>
<td>IM-Y [7]:</td>
<td>x 2</td>
<td>x 2</td>
<td>x 1</td>
<td>x 1</td>
<td>x 12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appears to be using dismissive words and phrases to describe his/her design ideation tools

| IM-X [70]: Presents his/her ideation work using multiple platforms | x 2 |
| IM-Z [75]: Respondent indicates having a different understanding of the meaning of design than I have | x 2 |

Table 21 – Discursive moves allocated across sample

8.6.1.2 Sub-category-level analysis

As table 21 shows, at a sub-category-level a wider range of discursive moves is revealed within the category IM-T: Carries out a move during the interview without apparent encouragement from the interviewer. Respondent 01’s diagram contains two sub-categories, the lowest number across the sample, whilst respondent 05’s contains six, the highest; those of respondents 03 and 13 both contain three sub-categories; and those of respondents 07 and 11 both contain four. All of the diagrams include [68]: Respondent turns a page without apparent encouragement from the interviewer and [69]: Respondent points to a page or an item on a page without apparent encouragement from the interviewer whilst those of respondents 03, 13, 07, 11 and 05 also include [71]: Student showcases work without explaining and/or discussing it. In addition, the diagrams of respondent 07 and 05 contain [72]: Student appears not to answer the question that was asked, whilst those of respondents 11 and 05 contain [74]: Identifies one or more pages in his/her sketchbook as being not yet complete. Respondent 05’s diagram alone contains [76]: Student explains and/or discusses work without showcasing it. Thus, at a sub-category-level it appears that there continues to be some homogeneity but also a degree of heterogeneity across the sample.
8.6.1.3 Allocations of sub-categories within category *IM-T: Carries out a move during the interview without apparent encouragement from the interviewer*

As [table 21](#) shows, the number of moves concerning the sub-categories within the category *IM-T: Carries out a move during the interview without apparent encouragement from the interviewer* also indicate heterogeneity across the sample. Respondent 01’s diagram contains seven allocations of [68]: Respondent turns a page without apparent encouragement from the interviewer, plus three prompted page-turns, indicating that, whilst eleven pages in total were revealed during the interview, the respondent turned almost twice as many as I either turned or prompted to be turned. Respondent 01’s diagram also contains three allocations of [69]: Respondent points to a page or an item on a page without apparent encouragement from the interviewer. Respondent 07’s diagram, in contrast, contains forty-one allocations of the sub-category [68]: Respondent turns a page without apparent encouragement from the interviewer, plus thirteen prompted page-turns, indicating that, whilst fifty-four pages in total were revealed during the interview, the respondent turned over more than three times as many as I either turned or prompted to be turned. Respondent 07’s diagram also contains twelve allocations of [69]: Respondent points to a page or an item on a page without apparent encouragement from the interviewer, five of [71]: Student showcases work without explaining and/or discussing it, and two of [72]: Student appears not to answer the question that was asked.

The number of unprompted points identified above may indicate that respondent 07 was significantly more inclined to lead the journey through the sketchbook material than respondent 01 was. This, indeed, was my perception during the interviews. Respondent 01’s appeared to be a fairly straightforward: I asked initial questions and he answered them; he showed sketchbook the material that he had brought; I asked questions about that and he answered them. Respondent 01 did not mention work that was missing, identify pages of sketchbook material as incomplete, fail to discuss work that was visible to me or appear not to answer a question that was asked – the discussion focused on what was there. Respondent
07, in contrast, seemed actively to be controlling the tabling of sketchbook material by pointing and page-turning without prompting, revealing work and not discussing it and not answering my questions. As was noted in chapter 3.0 Conceptualisation, any interview between two people may be influenced – consciously and unconsciously – by what both participants have brought to the event. However, respondent 07’s impact on the direction and pace of the interview appears to have been more overt than respondent 01’s.

Respondent 11’s diagram contains eighty-five allocations of the sub-category [68]: Respondent turns a page without apparent encouragement from the interviewer, plus twenty-two prompted page-turns, indicating that, whilst one-hundred-and-seven pages were revealed during this interview, the respondent turned over almost four times as many as I either turned or prompted to be turned. Her diagram shows fifty-six allocations of [69]: Respondent points to a page or an item on a page without apparent encouragement from the interviewer: far more than in the diagrams of respondents 01 and 07. It also shows sixteen allocations of [71]: Student showcases work without explaining and/or discussing it and ten of [74]: Identifies one or more pages in his/her sketchbook as being not yet complete (which was not allocated to respondents 01 or 07). These data indicate that respondent 11 may have been significantly more inclined to lead the journey through the sketchbook material than respondents 01 and 07 were, and that she had in effect at least two sketchbooks: the one on the table during the interview and a virtual one that would – or might – contain all kinds of other information that existed at the time only as notes on coasters.

Respondent 03’s diagram contains twenty-five allocations of the sub-category [68]: Respondent turns a page without apparent encouragement from the interviewer, plus one prompted page-turn, indicating that, whilst twenty-six pages in total were revealed during the interview, the respondent turned over twenty-five times as many as I either turned or prompted to be turned. Her diagram also shows nineteen allocations of [69]: Respondent points to a page or an item on a page without apparent encouragement from the interviewer and five of [71]: Student showcases work without explaining and/or discussing it. These data indicate that respondent 03 made more unprompted page-turning moves than respondent 01,
but fewer than respondents 07 and 11; made more unprompted pointing moves than respondents 01 and 07, but fewer than respondent 11; and showcased work without explaining/discussing it less frequently than respondent 11, but as frequently as respondent 07. However, the ratio of unprompted to prompted page-turns indicates that respondent 03 may have been considerably more inclined to lead the journey through the sketchbook material than respondents 01, 07 and 11. During the interview, I regarded her as having impacted comparatively minimally on the direction the interview took – perhaps no more than respondent 01 – however the above analysis indicates that she may have been playing a much more directive role.

Respondent 13’s diagram contains fifty-six allocations of the sub-category [68]: *Respondent turns a page without apparent encouragement from the interviewer*, plus three prompted page-turns, indicating that, whilst fifty-nine pages in total were revealed during the interview, the respondent turned over in excess of eighteen times as many as I either turned or prompted to be turned. Her diagram also shows sixty-nine allocations of [69]: *Respondent points to a page or an item on a page without apparent encouragement from the interviewer* and five of [71]: *Student showcases work without explaining and/or discussing it*. These data indicate that respondent 13 made more unprompted page-turning moves than all the respondents discussed thus far, except respondent 11; made more unprompted pointing moves than any of the respondents discussed thus far; and showcased work without explaining/discussing it less frequently than respondent 11 but as frequently as respondents 07 and 03. The ratio of unprompted to prompted page-turns indicates that respondent 13 may have been significantly more inclined to lead the journey from one page to the next through the sketchbook material than were respondents 01 and 07, but less inclined than respondent 03. The number of unprompted pointing moves suggests that respondent 13 was more inclined than any of the respondents discussed thus far to direct my attention whilst discussing the pages revealed.

Respondent 05’s diagram contains sixty-one allocations of the sub-category [68]: *Respondent turns a page without apparent encouragement from the interviewer*, plus thirty-seven
prompted page-turns, indicating that, whilst ninety-eight pages in total were revealed during the interview, she turned over almost twice as many times as I either turned or prompted to be turned. Respondent 05’s diagram also shows sixteen allocations of [69]: Respondent points to a page or an item on a page without apparent encouragement from the interviewer, twenty-one of [74]: Identifies one or more pages in his/her sketchbook as being not yet complete, twelve of [71]: Student showcases work without explaining and/or discussing it and sixteen of [72]: Student appears not to answer the question that was asked. These data indicate that respondent 05 made more unprompted page-turning moves than all the respondents across the sample except respondent 11, but fewer unprompted pointing moves than all respondents across the sample except respondent 01. The ratio of unprompted to prompted page-turns and the number of unprompted pointing moves indicates that respondent 05 may have been significantly less inclined to lead the journey through the sketchbook material than all the respondents except respondent 01. Indeed, during the interview with respondent 05, I was aware of feeling impatient about the lack of paper-based freehand sketches being tabled and wanting the discussion to progress. Thus, a high number of prompted page-turns could indicate me saying in effect, ‘Let’s get a move on.’ Respondent 05’s diagram also shows that she identified one or more pages in the sketchbook material as being not yet complete significantly more times than did respondent 11 (the only other respondent to whom this sub-category was allocated); showcased work without explaining and/or discussing it more times than did respondents 07, 03 and 13, but less than respondent 11; appeared not to answer the question that was asked significantly more times than respondent 07 (the only respondent to whom this sub-category was allocated); and explained and/or discussed work without showcasing it nineteen times (respondent 05 was the only respondent to whom this sub-category was allocated). This could indicate several things. If respondent 05 did not point to the work without having been prompted, it may have been because, during the interview, she was often not discussing the work but other matters such as her Wacom Pad or the time she spent reflecting under her duvet; or was explaining and/or discussing work that was not visible during the interview and therefore could not be pointed to. Also, I suspect that during much of the interview respondent 05 treated the sketchbook material as ‘tokens’ that gave permission for discussion to take place without necessarily
being the topic or focus of that discussion. Finally, it may be that this respondent was not inclined to discuss the work that she had placed in front of me.

8.6.1.4 Allocations of categories *IM-U [13]: Mentions experiencing a design insight through his/her ideation activities*, *IM-V: Mentions being guided by internal/external educational experiences*, *IM-W [38]: Evaluates his/her design process in an overview* and *IM-Y [7]: Appears to be using dismissive words and phrases to describe his/her design ideation tools*

Table 21 indicates the following:

Respondent 01’s diagram shows eleven allocations of the category *IM-U [13]: Mentions experiencing a design insight through his/her ideation activities*, respondent 05’s shows five and respondent 07’s shows two; the category was not allocated to any other respondent across the sample.

Regarding the category *IM-V: Mentions being guided by internal/external educational experiences*, the diagrams of respondents 11 and 13 show one allocation of the sub-category [29]: *Is being guided by internal educational experiences*, those of respondents 01 and 07 show four, and respondent 05’s shows six plus one allocation of [5]: *Is being guided by external influences*; the category was not allocated to respondent 03.

The diagrams of respondents 07 and 13 show two allocations of the category *IM-W [38]: Evaluates his/her design process in an overview*, respondent 11’s shows seven, and respondent 05’s shows fifteen.
The diagrams of respondent 03 and 13 show one allocation of the category *IM-Y [7]*: *Appears to be using dismissive words and phrases to describe his/her design ideation tools*, respondent 07’s shows two, respondent 11’s shows three and respondent 05’s shows twelve; the category was not allocated to respondent 01.

**Category IM-U [13]: Mentions experiencing a design insight through his/her ideation activities**

In my judgement, the number of allocations of this category in respondent 01’s diagram is surprisingly high. In comparison, respondent 05’s diagram shows only five allocations of this category, and respondent 07’s only two – both for considerably longer interviews than respondent 01’s – whilst the diagrams of respondents 11, 03 and 13 show no allocations at all. I am cautious of concluding from these data that respondents 11, 03 and 13 experienced no design insights, or respondents 05 and 07 comparatively few. Indeed, in my opinion the video-recordings of the interviews with these respondents show evidence of them having experienced design insights whilst the video-recording of respondent 01’s interview seldom reveals particularly insightful design work. What might explain this? It might be that:

1. Respondent 01 did indeed experience a very high degree of creative success (thus, almost every page of work resulted in at least one design insight).
2. He was not being challenging sufficiently (thus, almost every page of work produced resulted in what he deemed to be at least one design insight, and ‘creative block’ never occurred).
3. He had a limited idea of what a design insight was (thus, he found that that ideational moves frequently resulted in one)

And/or:

4. He wanted me – formerly his design tutor – to know that his was a successful design methodology, whether or not this actually was the case.
Alternatively, I might unintentionally have encouraged respondent 01 to mention design insights but offered less encouragement to the other respondents (I can find no evidence of this in the video-recordings but that does not guarantee that it did not happen). Also, I might have misinterpreted the data from the video-recording of the interview and concluded that this respondent was mentioning having experienced design insights when he was not. The other respondents, meanwhile, might actually have experienced fewer design insights, or felt less inclination to convince me that they were competent designers using ideation methods successfully, or felt discouraged – albeit inadvertently – from mentioning design insights during their interviews. Moreover, I might have overlooked data revealing design insights in the video-recordings of their interviews. Overall, I suspect that whilst the range of allocations of this category shown in the diagrams across the sample may indicate evidence of design insight, it may also indicate other things. How this matter has been tackled will be discussed below.

Sub-categories [29]: Is being guided by internal educational experiences and [5]:

Is being guided by external influences

As is the case with the category IM-U [13]: Mentions experiencing a design insight through his/her ideation activities, the number of allocations of the sub-category [29]: Is being guided by internal educational experiences and [5]: Is being guided by external influences in respondent 01’s diagram may also be comparatively high for the interview length – over much longer interviews respondent 07’s diagram shows the same number of allocations; the diagrams of respondents 11 and 13 show far fewer; respondent 05’s shows the highest number of allocations of this sub-category, and also one of [5]: Is being guided by external influences; the category was not allocated to respondent 03. What might these data indicate? It might be that:

1. Respondent 01 did indeed receive a lot of guidance from within the educational establishment, or thought this was the case.
2. He wanted to demonstrate to me that such guidance had been received –
whether or not it had – perhaps because it was thought that I wanted to know this.

3. I unintentionally prompted some of the respondents to mention internal and external support but not others, or misinterpreted the data from the video-recording of the interviews and over- or under-estimated the number of times respondents spoke of being guided by internal or external educational experiences.

And/or:

4. The other respondents did indeed receive less guidance or felt less inclination or incentive to mention receiving it.

Overall, I suspect that, whilst the range of allocations of this category shown in the diagrams across the sample may indicate evidence of the respondents having been guided by internal or external educational experiences, it might also indicate other things. How this matter has been tackled will be discussed below.

Sub-category IM-W [38]: Evaluates his/her design process in an overview

The allocations of this in the diagrams indicate that respondents 01 and 03 made comparatively few evaluations of their design process, respondents 07 and 13 slightly more, respondent 11 significantly more, and respondent 05 considerably more. What might these data indicate? It might be that:

1. The accounts of respondents 01 and 03 of their design process were mostly descriptive and contained comparatively few evaluations; respondents 07 and 13 produced comparatively more evidence of evaluative practice; and respondents 11 and 05 – particularly the latter – produced even more.

2. Respondents 11 and 05 wanted to demonstrate to me that they were evaluative practitioners, whether or not they were (perhaps because they
thought I would like to hear this), whilst respondents 01 and 03 did not think it necessary to evaluate their work (perhaps they thought I was there to do that), were disinclined to reveal an overview of their design process (perhaps because they regarded it as irrelevant, believed I did not want to hear about it, thought their work not very good, or were in a hurry to finish the interview) or were not asked the necessary questions to prompt a discussion on this matter.

3. I unintentionally prompted some of the respondents to reflect on their practice but not others.

4. I misinterpreted the data from the video-recordings of the interviews and over- or under-estimated the number of times respondents reflected on their practice.

And/or:

5. The other respondents did indeed reflect less frequently or felt less inclination or incentive to share their reflections during the interview.

Overall, I suspect that whilst the range of allocations of this category shown in the diagrams across the sample may indicate evidence of the respondents having worked in an evaluative manner, it might also indicate other things. How this matter has been tackled will be discussed below.

Sub-category IM-Y [7]: Appears to be using dismissive words and phrases to describe his/her design ideation tools

The allocations of this in the diagrams indicate that respondents 03 and 13 used comparatively few dismissive words and phrases, respondent 07 slightly more, respondent 11 even more and respondent 05 considerably more; the category was not allocated to respondent 01. What might these data indicate? It might be that:

1. Respondents 03 and 13 were generally less inclined to use dismissive language to describe their own work, respondent 07 slightly more so,
respondent 11 even more and respondent 05 considerably more.

2. Respondent 05 was more inclined to refer to her work dismissively than was respondent 11.

3. Respondents 05 and 11 were equally inclined to refer to their work dismissively, but used different means to do it, respondent 11 pointing to certain items of work (and thus taking – or trying to take – my attention away from other items) and respondent 05 using dismissive words and phrases.

4. Such language may have been used to say to me in effect, ‘This sketch is not very good,’ but it could have been false modesty used in the hope of prompting me to say something like, ‘On the contrary, it’s very good.’

And/or:

5. I unintentionally prompted some of the respondents to use dismissive words and phrases but not others, or that the data from the video-recordings of the interviews was not interpreted consistently. It should be noted that the word ‘just’ occurs frequently in common parlance in phrases such as, ‘I’m just off to the shops,’ or ‘I’m just putting the kettle on,’ and its meaning may or may not be the same when used in statements such as, ‘This is just a sketch.’

Overall, I suspect that whilst the range of allocations of this category shown in the diagrams across the sample may indicate evidence of the respondents using dismissive words and phrases to describe their work it might also indicate other things. How this matter has been tackled will be discussed below.

The above analysis revealed a number of interesting possibilities, but, as discussed, it also revealed certain difficulties that appeared to prevent me drawing more substantive conclusions. Seeking to tackle this I considered these same categories and sub-categories synoptically, together with the sub-categories of discursive move within the category IM-T: *Carries out a move during the interview without apparent encouragement from the interviewer*
and the category [69]: Respondent points to a page or an item on a page without apparent encouragement from the interviewer, discussed in section 8.6.1.3 above.

**Respondent 05**

I have noted above that respondent 05’s diagram shows the second-highest number of allocations of the category IM-U [13]: Mentions experiencing a design insight through his/her ideation activities across the sample, and the highest number of allocations of IM-V: Mentions being guided by internal/external educational experiences, IM-W [38]: Evaluates his/her design process in an overview and IM-Y [7]: Appears to be using dismissive words and phrases to describe his/her design ideation tools. I have also noted that a number of interpretations of these data are possible. It should be pointed out here that, overall, the data gave me a sense of a respondent who was working hard during the interview to convey the impression that good work had been produced whilst also protecting the work that was tabled from too much scrutiny by using phrases such as, ‘I just tend to cut everything out in a linear sort of, you know…’, and, ‘…just one form of mapping.’ In the analysis of the sub-categories within the categories IM-T: Carries out a move during the interview without apparent encouragement from the interviewer and [69]: Respondent points to a page or an item on a page without apparent encouragement from the interviewer, I noted that respondent 05 showed little inclination to lead the journey through the sketchbook material in front of us, but, for a considerable part the interview failed to reveal the work requested by me, discussed work I could not see, did not answer several questions I asked and so on. Considered together, the discursive moves allocated to respondent 05 begin to evidence someone who was unsure of the quality and/or suitability of the ideational work she was tabling, was cautious about engaging with it during the interview, and was using a range of discursive moves to attempt to conceal those supposed deficiencies whilst seeking to appear to me as a capable and successful spatial designer.

**Respondent 01**
I have noted above that respondent 01’s diagram shows the highest allocation of the category IM-U [13]: *Mentions experiencing a design insight through his/her ideation activities* across the sample, the joint-second-highest number of allocations of IM-V: *Mentions being guided by internal/external educational experiences*, one of the lowest allocations of IM-W [38]: *Evaluates his/her design process in an overview*, and no allocations of IM-Y [7]: *Appears to be using dismissive words and phrases to describe his/her design ideation tools*. I have also noted that a number of interpretations of these data are possible. It should be pointed out here that, overall, the data gave me a sense of a respondent who was not inclined during the interview to evaluate or be critical of his work, but did want to convey the impression of a well-tutored and successful student. In the analysis of the sub-categories within the categories IM-T: *Carries out a move during the interview without apparent encouragement from the interviewer* and IM-[69]: *Respondent points to a page or an item on a page without apparent encouragement from the interviewer*, I noted that respondent 01 showed little inclination to lead the journey through the sketchbook material, and that for a considerable part the interview, he revealed the work requested by me, discussed only work I could see, answered the questions asked and so on. Considered together, the discursive moves allocated to respondent 01 begin to evidence someone who had a limited grasp of his own abilities as a design student, but felt quite confident about the work and seldom used discursive moves to attempt to steer the interview away from where I appeared to want it to go.

**Respondent 03**

I have noted above that respondent 03’s diagram shows no allocations of the categories IM-U [13]: *Mentions experiencing a design insight through his/her ideation activities*, or IM-V: *Mentions being guided by internal/external educational experiences*, and comparatively few of IM-W [38]: *Evaluates his/her design process in an overview* and IM-Y [7]: *Appears to be using dismissive words and phrases to describe his/her design ideation tools*. I have also noted that a number of interpretations of these data are possible. It should be pointed out here that, overall, the data gave me a sense of a
respondent who was confident and thus not inclined during the interview to evaluate or be critical of her work, mention the design insights that were experienced through the ideational activities, nor convey the impression that guidance had been received as a student. However, in the analysis of the sub-categories within the categories IM-T: Carries out a move during the interview without apparent encouragement from the interviewer and [69]: Respondent points to a page or an item on a page without apparent encouragement from the interviewer, I noted that respondent 03 may have been considerably more inclined to lead the journey through the sketchbook material than any other respondent across the sample. Perhaps, rather than using words and phrases to create the impression of a well-tutored and successful student, she was seeking to use the sketchbook material? During the interview I regarded her as having impacted comparatively minimally on the direction the interview took, but the above analysis indicates that she may have been playing a much more directive role. Considered together, the discursive moves allocated to respondent 03 begin to evidence someone who was comparatively confident as a design student, but used unprompted page-turning and pointing moves to influence the direction of the interview.

**Respondent 07**

I have noted above that respondent 07’s diagram shows comparatively few allocations of the categories IM-U [13]: Mentions experiencing a design insight through his/her ideation activities, IM-W [38]: Evaluates his/her design process in an overview and IM-Y [7]: Appears to be using dismissive words and phrases to describe his/her design ideation tools, but the joint-second-highest number of allocations of IM-V: Mentions being guided by internal/external educational experiences. I have also noted that a number of interpretations of these data are possible. It should be pointed out here that, overall, the data gave me a sense of a respondent who was confident as a student, and willing during the interview to mention the support provided by others on a comparatively large number of occasions, but not inclined to evaluate or be critical of his work, nor to mention the design insights experienced through the ideational activities. However, in the analysis of the sub-categories within the categories IM-T:
Carries out a move during the interview without apparent encouragement from the interviewer and [69]: Respondent points to a page or an item on a page without apparent encouragement from the interviewer, I noted that respondent 07 seemed actively to be controlling the tabling of sketchbook material by pointing and page-turning without prompting, revealing work and not discussing it, and not answering my questions. His impact on the direction and pace of the interview appears to have been notably overt. Perhaps, rather than using words and phrases to convey to me that he was a well-tutored and successful student, this respondent was seeking to use the sketchbook material? Considered together, the discursive moves allocated to respondent 07 begin to evidence someone who, like respondent 03, was comparatively confident as a design student, but used unprompted page-turning and pointing moves to influence the direction of the interview.

Respondent 13

I have noted above that respondent 13’s diagram shows no allocations of the category IM-U [13]: Mentions experiencing a design insight through his/her ideation activities and comparatively few of the categories IM-W [38]: Evaluates his/her design process in an overview, IM-Y [7]: Appears to be using dismissive words and phrases to describe his/her design ideation tools and IM-V: Mentions being guided by internal/external educational experiences. I have also noted that a number of interpretations of these data are possible. It should be pointed out here that, overall, the data gave me a sense of a respondent who was extremely confident as a student and did not mention the role played by others in the development of the design proposals, evaluate or criticise the work nor seek to convey the impression using words and phrases that they were a successful student. However, in the analysis of the sub-categories within the categories IM-T: Carries out a move during the interview without apparent encouragement from the interviewer and [69]: Respondent points to a page or an item on a page without apparent encouragement from the interviewer, I noted that respondent 13 made more unprompted page-turning moves than all the respondents across the sample except respondent 11, made more unprompted pointing moves than any of the respondents
across the sample and showcased work without explaining/discussing it less frequently than respondent 11 but as frequently as respondents 07 and 03. This suggests that respondent 13 may have been significantly more inclined to lead the journey from one page to the next in the sketchbook material than respondents 01 and 07 were, but less inclined than respondent 03. That said, the number of unprompted pointing moves suggests that she was more inclined than any of the other respondents to direct my attention whilst discussing the pages revealed. Perhaps, rather than using words and phrases to convey to me that she was a well-tutored and successful student, respondent 13 was seeking to use the sketchbook material? Considered together, the discursive moves allocated to respondent 13 begin to evidence someone who, like respondents 03 and 07, was comparatively sure of her own abilities as a design student, but used unprompted page-turning and pointing moves to influence the direction of the interview.

**Respondent 11**

I have noted above that respondent 11’s diagram shows no allocations of the category IM-U [13]: *Mentions experiencing a design insight through his/her ideation activities*, comparatively few of IM-Y [7]: *Appears to be using dismissive words and phrases to describe his/her design ideation tools*, but the second-highest number of allocations of the categories IM-W [38]: *Evaluates his/her design process in an overview* and IM-V: *Mentions being guided by internal/external educational experiences*. I have also noted that a number of interpretations of these data are possible. It should be pointed out here that, overall, the data gave me a sense of a respondent who, whilst evidencing an evaluative approach and mentioning receiving the guidance of others, was inclined to let the work ‘speak for itself’ without feeling the needed to mention when and where she experienced design insights, or to speak of the work dismissively. However, in the analysis of the sub-categories within the category IM-T: *Carries out a move during the interview without apparent encouragement from the interviewer* and the category [69]: *Respondent points to a page or an item on a page without apparent encouragement from the interviewer*, I noted that that respondent 11 may have been significantly more
inclined to lead the journey through the sketchbook by means of page-turning and pointing moves than all the other respondents across the sample. The data also indicate that this respondent had in effect at least two sketchbooks: the one tabled during the interview and a virtual one that would – or might – contain all kinds of other information that existed at the time only as notes on coasters. This suggests that respondent 11 may have been less keen to let the work ‘speak for itself’ than I had conjectured above, because a lot of the sketchbook content was missing. That said, it should be noted that respondent 11 rarely mentioned these notes on coasters during the interview; although they were visible on the video-recording they were seldom brought up for discussion. Thus, considered together, the discursive moves allocated to respondent 11 continue to evidence someone who, like respondents 03, 07 and 13, was comparatively sure of her own abilities as a design student, but more than all the other respondents across the sample used unprompted page-turning and pointing moves to influence the direction of the interview.

The above analysis indicates that, during their interviews, the respondents may, to a greater or lesser extent, have interpreted themselves and their sketchbook material for me using various combinations of discursive moves. As I understand them, these interpretations are all translations, as discussed in chapter 3.0 Conceptualisation. If it is accepted that an interview is not a simple transfer of information from respondent to interviewer, but a series of translations during which the participants edit and modify not just the information they reveal but also themselves, the discursive moves begin to indicate how these translations may be occurring.

8.6.1.5 Links between discursive moves and academic level

Is there an obvious pattern that links discursive moves to, say, academic level? When I began to analyse the diagrams it was with the expectation that:
• both Level 4 students would be found to have used comparatively few unprompted page-turning and pointing moves, and to have shown a tendency to be dismissive of their work as they obediently and cautiously revealed their sketchbook material
• both Level 5 students would be found to have used a larger number of unprompted page-turning and pointing moves, together with an evaluative approach, as they led me through their expanding sketchbook material with greater confidence
• both Level 6 students would be found to have used an extremely large number of unprompted page-turning and pointing moves, and to have revealed considerable evidence of experiencing design insights, as they led me through their sketchbook material in a bold, directive manner

It appears that my expectation was misplaced. On the contrary, respondents 01 and 07 (Level 4), respondents 11 and 03 (Level 5) and respondent 13 (Level 6) all appear to have demonstrated comparatively high levels of confidence, whilst respondent 05 (Level 6) appears to have revealed a marked lack of confidence; the highest number of design insights appear to have been demonstrated by respondent 01 (Level 4); and respondent 05 (Level 6) appears to have had the highest tendency to be dismissive of the sketchbook material discussed.

8.6.1.6 Links between discursive moves and institution?

Is there an obvious pattern that links discursive moves to, say, institution? When I began to analyse the diagrams, it was with the expectation that students from my own university would reveal a greater inclination to be led during the interview, and those from elsewhere would reveal a consistently lesser inclination. It appears that this was not the case. On the contrary, respondents 05 and 03 from my own institution appear to have been highly inclined to follow their own leads during the interview, but then so, apparently, do respondent 13 from the former polytechnic and respondent 07 from the high-ranking institution, whilst respondent 01 from my own institution appears to have been considerably more inclined to be led.
8.6.1.7 Evidence of repeated patterns

The final stage of the analysis of the diagrams involved me examining the locations of categories and sub-categories of discursive moves in order to ascertain whether these provided evidence of one or more patterns. In this context, as with the ideational move analysis above, I did not require a pattern necessarily to be a lengthy sequence of exactly-replicated categories and/or sub-categories. It might instead consist of shorter, looser, more fleeting combinations which occur more than once. In general, I found no convincing evidence of patterns concerning the categories IM-U [13]: Mentions experiencing a design insight through his/her ideation activities, IM-V: Mentions being guided by internal/external educational experiences, IM-W [38]: Evaluates his/her design process in an overview and/or IM-Y [7]: Appears to be using dismissive words and phrases to describe his/her design ideation tools, except, perhaps, the following:

In respondent 07’s diagram, the discursive moves do not generally occur in comparatively lengthy sequences, but in comparatively short ones (for example, whilst respondent 05’s diagram shows series of six, eight, nine – and more – discursive moves in a row, and respondent 01’s diagram shows series of up to five, respondent 07’s diagram shows no more than four). This may further indicate that respondent 07 was inclined to talk about the work he was showing but not to say much about how others supported it, or what he thought about it, and was inclined to discuss what had been brought to the interview and not what had not been brought (this point is explored more fully in section 8.6.1.3).

The diagrams of respondents 01, 07, 11 and 13 appear to show the sub-categories [29]: Is being guided by internal educational experiences and [68]: Respondent turns a page without apparent encouragement from the interviewer and the category IM-W [38]: Evaluates his/her design process in an overview, as frequently adjacent to each other; and respondent 03’s diagram appears to show the sub-category [68]: Respondent turns a page without apparent encouragement from the interviewer and the category IM-W [38]: Evaluates his/her design process in an overview as frequently
adjacent to each other. Respondent 05’s diagram does not share these characteristics. Perhaps this indicates that, apart from respondent 05, there was a loose similarity between the way the other respondents accounted for the work in their sketchbooks, contextualised that work and navigated through the interview, whilst respondent 05 indicated a somewhat different approach.

What might the above data indicate? To begin with, as I have already noted, carrying out this programme of research revealed to me that the nature of the interview between myself and the respondent was not as I had initially imagined. At the commencement of this study, I had thought that, during their interview, the respondents would regard me as someone who was curious about their ideation work; would find me to be friendly, approachable and non-threatening; would feel comfortable speaking openly about their work; and would have no wish to conceal any matter relating to their sketchbook material (although they might end up doing so inadvertently if they were not steered carefully by me). I therefore regarded it as my job to ensure, by being observant and quick-thinking, and using appropriate prompts, that the respondents said and showed as much as possible during their interview. As my study progressed, it became clear that the interviews needed to be understood in a different way. For example, by viewing superficially the video-recording and transcript of my interview with respondent 05, I might conclude that she was a disorganised student who had brought a rather chaotic collection of sketchbook material, was discovering that it was difficult to find what she thought I wanted to see, and was feeling uncomfortable and anxious about that. However, respondent 05 was a student from my own institution. What might such a person think of the interview, and of me during it? She might see me as her tutor (which I had been until recently), regard the interview as a form of tutorial, and behave, to a greater or lesser extent, like a student presenting work for advice, feedback or assessment. If she did regard the interview in this way, she might during it have felt defensive in case her work was going to be criticised. Certainly, I have felt defensive in my Professional Doctorate tutorials: what if my tutor was not impressed and gave negative feedback, or made comments that I could not understand and exposed my intellectual limitations? This defensiveness tended on occasions to cause me to be cautious and selective about what I showed and said. It was possible that
respondent 05 regarded her encounter with me in a similar way, and experienced a similar
desire to edit what she showed. On the other hand, one or more of the respondents from my
own institution may, instead of wanting to conceal work, have wanted to show me what they
regarded as good work, turning pages quickly in order not to conceal them or end the
interview sooner, but to speed the journey towards the material they were proud of, pointing
to specific items in case I failed to spot them. I can recall also feeling like that on occasions
during my Professional Doctorate tutorials, for example when I wanted to show the latest
diagrams, so I kept the discussion on other items brief so that that looked-forward-to moment
could be reached more swiftly. In the video-recording of her interview, respondent 05 gave
few, if any, hints of being in a hurry to reach any items of sketchbook work so that I could
appreciate them – indeed, when she finally began tabling her paper-based freehand
sketches, she did not in my opinion show and discuss them fulsomely, but rather seemed to
continue moving swiftly through the interview. That may have been because she was keen to
end the interview for the reasons outlined above, but it could also have been for other
reasons: perhaps she was bored, keen to get on with her coursework because she had a
deadline to meet, impatient to attend a social engagement, feeling uncomfortable being in the
same room as me, suddenly unwell, or something else entirely? It is difficult to draw firm
conclusions about these possibilities. I will never know for sure, but it seems likely to me that
respondent 05 was experiencing conflicting thoughts about the interview as it took place, and
should not, therefore, be regarded as giving a clear, unedited, open account of her design
methodology.

How do respondent 05’s data compare with the data from other respondents from my
institution? Respondent 01 did not reveal a pattern of unprompted page-turning moves (seven
allocations) and unprompted pointing moves (three allocations) that might suggest a desire to
finish the interview, speed towards certain items of work and/or away from others, or direct
my attention towards certain items and/or away from others. Although he turned seven pages
during his interview, I turned four, indicating a comparatively high level of participation on my
part. Moreover, he did not mention that his sketchbook was incomplete, reveal work without
explaining and/or discussing it, or explain and/or discuss work without showcasing it, nor did
he appear not to answer a question that was asked. This might be seen as indicating a student who was feeling quite comfortable about the work being showcased, and about being interview by me. Respondent 03 seems to have been, at twenty-five allocations, a more frequent unprompted page-turner than respondent 01 was, but a much less frequent page-turner than respondent 05 was (sixty-one allocations) (all three of these people came from my institution). Also, respondent 03 seems to have been, at nineteen allocations, a more frequent unprompted finger-pointer than respondent 01 (three allocations) but a much less frequent finger-pointer than respondent 05 (sixteen allocations). It may be that these figures suggest that respondent 03 was more comfortable showing sketchbook material to me during the interview than respondent 05, but less comfortable than respondent 01. This is possible, but, as has been argued above, the data should not be taken in such a simplistic way.

9.0 Conclusions

9.1 Preamble

Six years ago, my professional experiences as both a registered architect and a senior lecturer in interior design had led me to believe that paper-based freehand sketches were an essential tool for ideation, and to suspect that the production of such sketches by undergraduates was in decline. I devised this study in order to investigate that perceived decline. The research participants I defined as level 4 to 6 (year 1 to 3) students from a range of spatial design courses at a range of UK higher education establishments (including my own). The primary data comprised video-recordings, and transcripts of focused interviews between myself and these participants during which the ideational moves (ie: the various sketchbook-based ideational activities which take place during design ideation, including paper-based freehand sketching, model-making, precedent research and digital drawing) used in support of developmental work on a selected design project were discussed, and the sketchbook material tabled. These data I examined using a form of content analysis. However, during the main study, this revealed that, across the sample, the respondents were making abundant use of paper-based freehand sketching during ideation, selecting from by-and-large the same pallet of ideational moves but making those moves in different
combinations, with different frequencies, and with different levels of connectedness. My analysis also revealed that the discussion of sketchbooks in a focused interview setting was not a source of objective, comprehensive, unedited data. These findings called into question my initial premise and led to a move from content analysis to an ‘evolved’ grounded theory approach, predicated not on an hypothesis, aim and objectives but the following research questions:

- Which ideational moves were used by spatial design undergraduates and why did they use them?
- How frequently did each spatial design undergraduate use each of these ideational moves and what appeared to be the reasons for this?
- What degrees of connectedness between ideational move were manifest in each interview and what appeared to be the reasons for these?
- What patterns of ideational move use were manifest and what appeared to be the reasons for these?
- What discursive moves (ie: physical or spoken interactions during a given interview between the respondent and myself, and/or the respondent and the sketchbook material, other than as guided by the interview question areas, including page-turning, page moving/sorting, pointing, the respondent not tabling sketchbook material that I had asked to see, and the respondent tabling sketchbook material that I had not asked to see) did each respondent make approaching the discussion of their ideational work and what were the apparent reasons for these?
- How did the above compare across the sample and for what apparent reasons?

During ‘evolved’ grounded theorising, I sought to categorise and sub-categorise the data in terms of ideational moves and discursive moves. The consideration of discursive moves brought into focus my presence in, and impact on, the data, and that led me to adopt a constructivist grounded theory approach. During this, I devise a series of diagrams. These were of two types: ‘timeline’ diagrams, which represented the course of the interview, starting at the beginning of the discussion on the design project, and showing every category, sub-
category and connection; and ‘synoptic’ diagrams, which represented every category, sub-
category and connection, with no indication of a chronology. These were intended to aid the
sorting process by which theoretical links between the categories and sub-categories were
identified, considered and developed at an abstract level, but the process, in turn, led me to
ANT, where I found two concepts useful in order to conceptualise the study: translation and
circulating references, which offered powerful ways of understanding the data, analytical
methods, emerging theory and, indeed, the study as a whole.

From the above summary, it should be clear that, overall, this has not been a conventional
empirical study, a traditional and solely reflective account of systemic practice, or even a
mixed-methods approach, but rather a multi-modal methodology organised into four phases
each of which formed a critical moment in the study:

- Phase 1: content analysis
- Phase 2: 'evolved' grounded theory
- Phase 3: constructivist grounded theory
- Phase 4: the application of ANT concepts of circulating references and translation

This recollects Orona’s account of a non-linear research process (Orona, 1990, in Strauss
and Corbin, 1997) in that each phase signaled for me a positional shift. After Phase 1, the
subsequent phases began with my revisiting and reappraising the outcomes of the earlier
phase before moving on in a new, but related, direction informed by the same qualitative,
relativist, constructivist, reflexive approach.

Because the data and theorising are the outcomes of interactions between myself and
thirteen participants, I do not regard the research findings as being generalisable to an entire
student population. I have sought to construct theory that increases understanding of the
approaches to ideation of a sample of UK-based spatial design undergraduates during design
development. This informs my teaching practice now that the study is completed, and I hope
it will prompt other academics to investigate whether their own students manifest similar
outcomes and, by those means, contribute to wider discussions concerning undergraduate spatial design education – particularly expectations of what sketchbook material should comprise in an academic setting, and the formative and summative assessment of undergraduate spatial design development activity.

It is at this point appropriate to return to the research questions listed above. The account that follows uses these as section headings and summarises the answers to them. However, it should be prefaced here that a number of alternative ways of approaching the data on ideational and discursive moves were considered during the analysis:

1. Each respondent reported accurately and clearly during the interview; the sketchbook material was revealed in its entirety; and I heard, saw, analysed, categorised, sub-categorised and produced diagrams all of the data with precision. This I regard as highly unlikely.

2. On occasions, one or more respondents misunderstood what was being asked by, or discussed with, me and thus provided inaccurate information in error. This I regard as highly likely. At times respondents requested clarification (for example, in response to a question respondent 07 asked me, ‘What d’you mean by that?’) or appeared to attempt to correct a misunderstanding (for example, respondent 11, having stated she was using CAD software, then said, ‘Oh sorry, no I’m not…I mean I’m using Photo Shop…’). It is reasonable to assume that, on occasions, the respondents may have chosen not to ask for clarification, not realised they had misunderstood, or not appreciated that they had provided confusing data.

3. I failed to notice data in the video-recordings and/or was unable to see or hear it clearly. This I regard as highly likely. I estimate that I viewed most of each video-recording across the sample between ten-and-twelve times but this did not allow me to spot all the data. The sketchbook material was not always clear (some of it was difficult-to-see because it was out of focus, out of shot or revealed only briefly; some
was difficult-to-understand because it was ambiguous and thus needed interpretation; the spoken words were not always clear (some were difficult-to-hear because of background noise or the low volume of the sound recording; some were some difficult-to-understand because they were ambiguous and thus needed interpretation); discursive moves, such as unprompted page turning and pointing, were not always easy-to-see; and the respondent's interaction with the sketchbook material, myself as interviewer, and the interview process was on occasions unexpected and/or puzzling and thus in need of interpretation. Also, the sketchbook material was never discussed in its entirety. The respondents made selections by showing work they had brought, without discussing it; not showing work they had brought (although I could glimpse it on the table); mentioning work they had not brought; and pointing to and discussing certain items but not others. I also made selections from the sketchbook material, for example by choosing to discuss what I regarded as an interesting-looking paper-based freehand sketch but not one that appeared less interesting. Furthermore, hand-written or word-processed text was never read out loud fully word-for-word, nor were pages of sketches and photographs discussed fully item-by-item – the respondents appeared not to expect to do this and there was insufficient time for such thorough exploration. Thus, during each interview, the respondents and I were translating the sketchbook material.

4. One or more of the respondents may have consciously or unconsciously responded to the interview setting by attempting to convey certain messages to me. This I regard as highly likely. For example, they may have sought to persuade me – whether or not this was actually the case – that they had worked in an insightful, evaluative, self-critical way and/or engaged with the support available. This may have been for personal reasons (for example, a means of coping with the challenges of showing ideational work to a former tutor, in the cases of respondents 01, 03 and 05, or a stranger, in the cases of respondents 07, 11 and 13; a desire to appear comparable or superior to others within the sample; and/or a wish to demonstrate to me that it was worthwhile carrying out the interview). The reasons could also have been
institutional (for example, wanting to be a good ambassador for the institution; or seeking to avoid the interview outcomes having a negative impact on summative assessment – even though I believe I made it clear that they would have no such impact). It may also have been thought that I wanted to hear that the respondents had worked in an insightful, evaluative, self-critical way and/or engaged with the support available – indeed, it is possible that I may unintentionally and unknowingly have encouraged this thought, even though the video-recordings do appear to evidence it.

5. I misunderstood the data from one or more video-recordings. This I regard as quite likely. On several occasions I found it necessary to make interpretive judgements, for example, in order to determine whether:

- a page containing multiple samples of mirrored glass comprised one ideational move or several (respondent 01)
- the two- and three-dimensional CAD drawings discussed were each multiple views of a single three-dimensional digital model, or a number of separate digital representations (respondents 07 and 11)
- a paper-based freehand sketch diagram produced was actually a paper-based freehand perspective sketch because it showed a three-dimensional form (respondent 07)
- four strips of closely-spaced digital semi-abstract images constituted four separate collages, or one (respondent 13)
- photographs had been taken by the respondent, or obtained from a secondary source (respondent 05)
- when respondents pointed very quickly to multiple items on a page they were making one move or several (respondents 11, 03 and 13)
- when a respondent waved a hand over a page of sketchbook material she was pointing to a specific ideational move or making a different gesture, one that I perhaps not understand (respondent 13)
• when a respondent lifted the left-hand page as though about to turn it, but then dropped it again without turning it, this comprised two moves, no move or a different type of move (respondents 13 and 05)
• when a respondent turned away from the table to search for drawings on the floor, but did not actually pick up anything, this comprised one move, no move or a different type of move (respondent 07)

It is unlikely that these interpretations were invariably infallible.

6. The data might evidence a combination of the above across the sample. This I regard as highly likely.

In a carefully designed and conducted quantitative, positivist study it may be that the above matters would have been addressed, but, in this relativist study informed by aspects of ANT, they are not regarded as failings or weaknesses but as translations: changes that occurred when human and non-human actors came together to form temporary networks concerning a series of focused interviews. It has already been mentioned that numerous translations are likely to have occurred during this study, including the respondents’ behaviour, my behaviour and the sketchbook material. These translations have been regarded as part of the data to be kept in mind as the analysis proceeded and the conclusions were written.

9.2 Returning to the research questions

9.2.1 Which ideational moves were used by spatial design undergraduates and why did they use them?

At a category-level it would appear that all the respondents evidenced a basic ‘core’ of categories: IT-A: Uses paper-based ideation tools response to a spatial design matter, IT-B: Carries out research in support of design ideation and IT-C [22]: Produces and uses photographs in response to a spatial design matter. In addition, respondents 07, 11, 03, 13
and 05 all appear to have evidenced the category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter, and respondents 07, 11 and 13 the category IT-G [56]: Produces one or more physical model/s in response to a spatial design matter. If this is indeed the case, I suspect that few spatial design practitioners and academics would find it particularly surprising: surely it is to be expected that most, if not all, spatial design undergraduates would, during design project work, use paper-based ideational moves, carry out research, produce photographs, produce two- or three-dimensional digital images, and produce one or more physical model/s. However, I am more interested in respondent 01 from level 4 and respondent 05 from level 6 whose diagrams appear not to follow this pattern. Neither evidenced the category IT-G [56]: Produces one or more physical model/s in response to a spatial design matter; both evidenced IT-D [49]: Uses real materials in response to a spatial design matter (whilst no other respondent did); respondent 01 did not evidence IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter; and respondent 05, uniquely within the sample, evidenced IT-F [64]: Generates ideas in response to a spatial design matter by chance through an experiential, sensorial approach.

In comparison with the category-level results, the range of sub-categories, and categories that do not contain sub-categories, evidenced by the respondents varied considerably. Respondent 07 evidenced a total of eighteen groups of distinct ideational moves, the widest range across the sample, and respondent 01 a total of seven, the narrowest range, yet both were level 4 students albeit at different institutions. Respondent 11 evidenced a total of sixteen groups of distinct ideational move, the second-widest range across the sample, and respondent 03 a total of ten, the second-narrowest, yet both were level 5 students albeit at different institutions. Respondent 13 evidenced a total of thirteen groups of distinct ideational move, and respondent 05 twelve, a narrower range than those of respondents 07 or 11 but a wider range than those of respondents 01 and 03, yet respondents 13 and 05 were both level 6 students albeit at different institutions. Before producing the ‘synoptic’ diagrams I had speculated on whether these would evidence clear patterns of ideational move occurrence and on whether there might be clear differences or similarities between institutions. However,
the diagrams have suggested that, across the sample, ideational move occurrence at the
level of sub-categories, and categories that do not contain sub-categories, was
heterogeneous and unpredictable, and that this cannot be explained satisfactorily by referring
to the student’s academic level or institution.

Finer-grained analysis of the sub-categories within their respective categories suggested that
there may be a basic ‘core’ of these across the sample.

**Category IT-A: Uses paper-based ideation moves response to a spatial design
matter**

Within this, all the respondents evidenced the sub-categories [4]: Uses a word-based
approach in response to a spatial design matter, [6]: Produces and uses paper-based
freehand perspective sketches in response to a spatial design matter and [33]:
Produces and uses paper-based freehand sketch diagrams in response to a spatial
design matter; respondents 07, 11, 03, 13 and 05 evidenced [31]: Produces and uses
paper-based freehand plan sketches in response to a spatial design matter and [39]:
Produces and uses paper-based freehand elevation sketches in response to a spatial
design matter; respondents 01, 11, 13 and 05 evidenced [12]: Produces and uses
collage to investigate design ideas; and respondents 11, 03, 13 and 05 evidenced
[32]: Produces and uses paper-based freehand section sketches in response to a
spatial design matter. It is possible that these may comprise the basic ‘core’ of sub-
categories within this category, but the category nonetheless indicates considerable
heterogeneity. Only respondents 07 and 11 evidenced [40]: Produces and uses
paper-based plan drawings, hand-drawn using a straight edge, in response to a
spatial design matter; only respondent 07 evidenced [73]: Produces and uses paper-
based section drawings, hand-drawn using a straight edge, in response to a spatial
design matter; and only respondent 11 evidenced [58]: Creates and uses painting/s
experimentally in response to a spatial design matter. Overall, respondent 01 (from
my institution, level 4) evidenced the narrowest range of sub-categories within this
category; respondents 07 (from the high-ranking institution, level 4) and 11 (from the
former polytechnic, level 5) the joint-widest; respondents 13 (from the former
polytechnic, level 6) and 05 (from my institution, level 6) the joint-second-widest; and
respondent 03 (from my institution, level 5) the second-lowest.

**Category IT-B: Carries out research in support of design ideation**

Within this, all the respondents evidenced the sub-category [9]: Carries out
supporting visuo-spatial research in connection with design ideation. It is possible that
this may comprise the basic ‘core’ within this category. Only respondents 07 (from the
high-ranking institution, level 4), 11 (from the former polytechnic, level 5) and 03 (from
my institution, level 5) evidenced [45]: Carries out non-visuo-spatial research (eg:
textual, auditory, interview based…) in connection with design ideation.

**Category IT-E: Produces two- or three-dimensional digital images in response
to a spatial design matter**

Within this, the respondents evidenced a range of sub-categories across the sample:
respondents 07, 11 and 03 evidenced [30]: Uses CAD software to produce 3D
drawings in response to a spatial design matter; respondents 07, 11 and 13
evidenced [60]: Uses CAD software to produce plan in response to a spatial design
matter; respondents 07, 13 and 05 evidenced [65]: Uses CAD software to produce
section drawings to in response to a spatial design matter; respondent 13 alone
evidenced [63]: Uses CAD software to produce elevation drawings in response to a
spatial design matter; and respondent 07 alone evidenced [66]: Uses CAD software
to produce exploded isometric drawings in response to a spatial design matter.

Overall, respondent 01 (from my institution, level 4) evidenced no sub-categories
within this category; respondent 07 (from the high-ranking institution, level 4) the
widest range of sub-categories; respondent 13 (from the former polytechnic, level 6)
the second-widest; respondent 11 (from the former polytechnic, level 5) the third-
widest; and respondents 03 and 05 (from my institution, levels 5 and 6 respectively)
the second-narrowest. No respondent evidenced all the sub-categories within this
category, suggesting that these do not form part of the basic ‘core’. Before producing
the ‘synoptic’ diagrams I had speculated on whether these would evidence abundant use of CAD software at most or all of the institutions. However, the diagrams indicated that, across the sample, CAD usage was somewhat lower than the use of paper-based ideational moves in response to a spatial design matter, and that this cannot be explained satisfactorily by referring to the student’s academic level (although respondents from my own institution appear to have evidenced lowest usage).

The above analysis suggests that, whilst there are indications of a basic ‘core’ of sub-categories shared by all respondents, the overall range appears to have varied, and which respondent evidenced the widest, which the narrowest and so on seems not to have depended upon academic level or institution. This heterogeneity concerns what appears to be a clearly delimited range of seventeen sub-categories:

[4]: Uses a word-based approach in response to a spatial design matter

[6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter

[33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter

[31]: Produces and uses paper-based freehand plan sketches in response to a spatial design matter

[39]: Produces and uses paper-based freehand elevation sketches in response to a spatial design matter

[12]: Produces and uses collage to investigate design ideas

[32]: Produces and uses paper-based freehand section sketches in response to a spatial design matter

[40]: Produces and uses paper-based plan drawings, hand-drawn using a straight edge, in response to a spatial design matter

[73]: Produces and uses paper-based section drawings, hand-drawn using a straight edge, in response to a spatial design matter
[58]: Creates and uses painting/s experimentally in response to a spatial design matter
[9]: Carries out supporting visuo-spatial research in connection with design ideation
[45]: Carries out non-visuo-spatial research (eg: textual, auditory, interview based...) in connection with design ideation
[30]: Uses CAD software to produce 3D drawings in response to a spatial design matter
[60]: Uses CAD software to produce plan in response to a spatial design matter, [65]: Uses CAD software to produce section drawings in response to a spatial design matter, [63]: Uses CAD software to produce elevation drawings in response to a spatial design matter and [66]: Uses CAD software to produce exploded isometric drawings in response to a spatial design matter.

To this should be added two categories that do not contain sub-categories:

IT-C [22]: Produces and uses photographs in response to a spatial design matter
IT-G [56]: Produces one or more physical model/s in response to a spatial design matter.

9.2.2 How frequently did each spatial design undergraduate use each of these ideational moves and what appeared to be the reasons behind this?

The category with the highest number of allocations across the sample was IT-A: Uses paper-based ideation tools response to a spatial design matter (respondent 07: one-hundred-and-twenty-nine allocations), and this was always the category with the highest number of allocations for each respondent (respondent 13: one-hundred allocations; respondent 11: ninety-one allocations; respondents 05 and respondent 01: forty-seven allocations; and respondent 03: thirty-three allocations). Within that category, the range of allocations of the various sub-categories was somewhat diverse. The most-allocated sub-category overall was [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial
design matter, except for respondent 07 in whose case it was [33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter. Moreover, the sub-category [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter was allocated to respondent 11 forty times, respondent 07 thirty-five times, respondent 01 thirty-four times, respondent 13 twenty-eight times, respondent 05 seventeen times and respondent 03 six times, whilst the sub-category [33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter was allocated to respondent 07 sixty times, respondent 11 twenty-nine times, respondent 13 eighteen times, respondent 05 eleven times, respondent 01 six times and respondent 03 three times. Furthermore, the category IT-C [22]: Produces and uses photographs in response to a spatial design matter was allocated to respondent 11 seventy-seven times (the highest allocation of any sub-category, and category that does not contain sub-categories, for this respondent), but it was allocated to the other respondents somewhat less frequently: to respondent 05 twenty-six times; to respondent 03 twenty-two times; to respondent 13 sixteen times; to respondent 07 twelve times; and to respondent 01 eight times. Finally, the sub-category [9]: Carries out supporting visuo-spatial research in connection with design ideation was allocated to respondent 05 twenty-four times, and the category IT-C [22]: Produces and uses photographs in response to a spatial design matter was allocated to this respondent twenty-six allocations. In combination these add up to more than the total allocation of sub-categories within IT-A: Uses paper-based ideation tools response to a spatial design matter. These results suggest a rather complicated situation in which there is no certain correlation between the range of sub-categories, and categories that do not contain sub-categories, allocated to each respondent, and the total number of moves identified within each.

It was noted above that the respondents’ approaches to design ideation appeared to be more heterogeneous and unpredictable the more fine-grained the analysis of the diagrams was. The analysis of allocations of sub-categories, and categories that do not contain sub-categories, across the sample suggests that each respondent was making different choices from the ideational moves available – in some cases markedly so.
9.2.3 What degrees of connectedness between ideational moves were manifest in each interview and what appeared to be the reasons for these?

The connectedness of the sub-categories, and categories that do not contain sub-categories, appears to have varied considerably across the sample. The results appear to show a degree of homogeneity, inasmuch as, for respondents 11, 13, 07 and 01, one of the sub-categories within the category IT-A: *Uses paper-based ideation tools response to a spatial design matter* evidenced the highest levels of connectedness, and for respondents 03 and 05 one of the sub-categories within that category was connected directly to a different sub-category, or category that did not contain a sub-category, that itself evidenced the highest levels of connectedness. Thus, *IT-A: Uses paper-based ideation tools response to a spatial design matter* appears to have been a strong indicator of high connectivity across the sample. That said, four of the sub-categories that evidenced no connectivity were also within this category indicating that, whilst for some respondents it was the most connected category, for others it was the least connected.

The analysis also indicated heterogeneity in several ways. Firstly, although the category IT-C [22]: *Produces and uses photographs in response to a spatial design matter* was highly connected in one case (respondent 11 evidenced it having the second-highest level of connectedness across the sample), it was somewhat less highly-connected in several others (respondents 03 and 13 evidenced the ninth- and tenth-highest levels respectively, and respondents 01 and 05 the eighteenth-highest). Secondly, where data from the video recordings prompted me to allocate one or more sub-categories from the category IT-E: *Produces two- or three-dimensional digital images in response to a spatial design matter* (ie: excluding respondent 01), the respondents evidenced connectedness that was comparatively diverse across the sample and that did not indicate any patterns. Thirdly, the categories and sub-categories that evidenced connectivity were diverse: IT-G [56]: *Produces one or more physical model/s in response to a spatial design matter* (respondent 07); [12]: *Produces and uses collage to investigate design ideas* (respondent 13); and [31]: *Produces and uses paper-
based freehand plan sketches in response to a spatial design matter, [39]: Produces and uses paper-based freehand elevation sketches in response to a spatial design matter, [32]: Produces and uses paper-based freehand section sketches in response to a spatial design matter and [64]: Generates ideas in response to a spatial design matter by chance through an experiential, sensorial approach (respondent 05). Fourthly, whilst for several respondents the connectedness of the sub-category [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter was comparatively high, it was comparatively low for respondent 01; whilst for respondents 03 and 05 the connectedness of [9]: Carries out supporting visuo-spatial research in connection with design ideation was comparatively high, it was less high for respondent 13 and comparatively low for respondents 07 and 01; and whilst for respondent 13 the connectedness of [32]: Produces and uses paper-based freehand section sketches in response to a spatial design matter was comparatively high, it was comparatively low for respondent 11. Fifthly:

Respondent 11’s diagram evidenced the highest level of connectedness overall across the sample but also a comparatively large number of categories and sub-categories with low connectedness. Furthermore, it showed a comparatively large gap between the highly connected categories and sub-categories and the poorly connected ones. This suggested that respondent 11 may perhaps have had a palette of ideational moves that she used in combination much more than others that were available.

Respondent 13’s diagram evidenced the second highest level of connectedness overall, but it also showed no comparatively large gap between the highly connected categories and sub-categories and the less highly connected ones, and comparatively fewer of the latter.

Respondent 07’s diagram evidenced the third highest level of connectedness overall, but the it showed a comparatively large number of categories and sub-categories with low connectedness, and no comparatively large gap between the highly connected categories and sub-categories and the poorly connected ones.
Respondent 03’s diagram evidenced the fourth highest levels of connectedness overall, but it showed comparatively few poorly connected categories and sub-categories, and no comparatively large gap between the highly connected categories and sub-categories and the less highly connected ones.

Respondent 05’s diagram evidenced the joint lowest levels of connectedness with respondent 01 – see below – but it showed a comparatively large number of categories and sub-categories with low connectedness, plus a comparatively large gap between the highly and poorly connected categories and sub-categories.

Respondent 01’s diagram evidenced the joint lowest levels of connectedness with respondent 05 – see above – but (in contrast to the diagrams for respondents 11 and 05 but in common with those for respondents 13, 03 and 07) it did not illustrate a comparatively large gap between the highly connected categories and sub-categories and the poorly connected ones.

Finally, it should be noted that, although I began this study suspecting that students preferred to use word-based rather than image-based ideational methodologies, the connectedness of [4]: Uses a word-based approach in response to a spatial design matter was comparatively low for respondents 03 and 07, lower for respondent 01, and even lower for respondent 05. Moreover, although I began this study suspecting that students preferred to use digital rather than paper-based means of creating and manipulating images, and found many statements confirming this during the literature review, the connectedness of sub-categories within the category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter was comparatively low for all respondents.
9.2.4 What patterns of ideational move use were manifest and what appeared to be the reasons for these?

In this context I did not require a pattern necessarily to be a clearly-defined sequence of exactly repeated categories and/or sub-categories. It might instead have consisted of shorter, more loose, more fleeting combinations which occurred more than once. I found it difficult to see evidence of such patterns in the respondents’ diagrams, but I identified certain possibilities.

**Category IT-A: Uses paper-based ideation tools response to a spatial design matter**

Respondent 01’s diagram revealed that one sub-category within this category occurred quite frequently early on in the interview, and also towards the end: [4]: *Uses a word-based approach in response to a spatial design matter*. Although, within his diagram the sub-category [6]: *Produces and uses paper-based freehand perspective sketches in response to a spatial design matter* occurred most frequently (see discussion above), this was in four large allocations, whilst [4]: *Uses a word-based approach in response to a spatial design matter* was interspersed throughout.

Respondent 07’s diagram also suggested that one sub-category within this category was particularly important, but, in this case it was [33]: *Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter*, which was interspersed throughout, sometimes in large allocations and sometimes not, mostly connected but sometimes not.

These data indicate that, in respondent 01’s design ideation, the sub-category [4]: *Uses a word-based approach in response to a spatial design matter* played a recurring role, whilst, for respondent 07, it was [33]: *Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter.*
Categories **IT-B: Carries out research in support of design ideation** and **IT-B: Carries out research in support of design ideation**

In contrast to the diagrams of respondents 01 and 07, respondent 11’s diagram contained evidence of several possible patterns of ideational moves. Sub-categories within **IT-B: Carries out research in support of design ideation** occurred comparatively frequently near the beginning, where they combined with certain sub-categories within **IT-A: Uses paper-based ideation tools response to a spatial design matter**, and occurred again approximately fourth-fifths of the way into the diagram, where they did not combine in this way. Also, after approximately one-fifth of the way into the diagram, **IT-C [22]: Produces and uses photographs in response to a spatial design matter** occurred comparatively frequently, either connected to a sub-category within **IT-A: Uses paper-based ideation tools response to a spatial design matter**, or else apparently unconnected. These data suggest that, unlike respondents 01 and 07, respondent 11 may have used several subtly shifting combinations of ideational moves in a relatively fluid manner.

Categories **IT-C [22]: Produces and uses photographs in response to a spatial design matter**, **IT-B: Carries out research in support of design ideation** and **IT-A: Uses paper-based ideation tools response to a spatial design matter**

Respondent 03’s diagram contained, near its beginning, evidence of a pattern comprising **IT-C [22]: Produces and uses photographs in response to a spatial design matter** connected to the sub-category [9]: **Carries out supporting visuo-spatial research in connection with design ideation**, and one or more sub-categories within **IT-A: Uses paper-based ideation tools response to a spatial design matter**. Towards the middle of the diagram, further sub-categories within **IT-A: Uses paper-based ideation tools response to a spatial design matter** appear to form a different pattern, sometimes connected, sometimes not, and, in the latter part of the diagram, sub-categories within **IT-B: Carries out research in support of design ideation**, connected to sub-categories within **IT-A: Uses paper-based ideation tools response to a spatial design matter**, appear to form a new pattern. This suggests that, like respondent 11, respondent 03
may also have used several subtly shifting combinations of ideational moves in a relatively fluid manner. More interestingly, perhaps is that, early on in the diagram, there are indications that respondent 03 worked in a more connected way than any other respondent across the sample with categories and sub-categories connected in groups of three, four and five.

**Categories IT-C [22]: Produces and uses photographs in response to a spatial design matter, IT-G [56]: Produces one or more physical model/s in response to a spatial design matter) and IT-A: Uses paper-based ideation tools response to a spatial design matter**

In the second- and third-fifths of respondent 13’s diagram, IT-C [22]: Produces and uses photographs in response to a spatial design matter (often connected to IT-G [56]: Produces one or more physical model/s in response to a spatial design matter and the sub-category [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter) occurred five times. From the second-fifth of the diagram onwards, the sub-category [33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter occurred comparatively frequently, often connected to sub-categories within IT-A: Uses paper-based ideation tools response to a spatial design matter.

Respondent 05’s diagram suggested that the sub-category [9]: Carries out supporting visuo-spatial research in connection with design ideation may have provided an underlying structure during much of the video-recording of the interview, inasmuch as it was allocated on almost every page. This possible pattern was interspersed with three large allocations of IT-C [22]: Produces and uses photographs in response to a spatial design matter during the early stage of the diagram, and followed later on by several sub-categories within IT-A: Uses paper-based ideation tools response to a spatial design matter.
Category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter

In respondent 07’s diagram, ideational moves concerning this category occurred on three separate occasions dispersed throughout; in respondent 11’s diagram, they occurred on two occasions, once near the beginning and once near the end; in the diagrams of respondent 03, 13 and 05, they occurred once, either in the first-quarter of the diagram (respondent 03), in the final-fifth (respondent 13) or in the latter stage (respondent 05). I find these occasional appearances of sub-categories within this category to be interesting. I have already noted that, before producing the ‘synoptic’ diagrams, I had speculated on whether these would evidence abundant use of CAD software at most or all of the institutions, and that the diagrams have indicated that, across the sample, CAD usage was somewhat lower than the use of paper-based ideational moves response to a spatial design.

Diagram beginnings and endings

These also revealed clear evidence of heterogeneity. The diagrams of respondents 01, 13, 07 and 11 all begin with ideational moves within the category IT-A: Uses paper-based ideation tools response to a spatial design matter, but, in the diagrams of respondents 01 and 13, that sub-category was [4]: Uses a word-based approach in response to a spatial design matter; in respondent 07’s it was [33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter (connected to the sub-categories [4]: Uses a word-based approach in response to a spatial design matter and [45]: Carries out non-visuo-spatial research (eg: textual, auditory, interview based...) in connection with design ideation), and respondent 11’s diagram it was an unconnected [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter. In contrast, respondent 03’s diagram began with the category IT-C [22]: Produces and uses photographs in response to a spatial design matter, and the sub-categories [9]: Carries out supporting visuo-spatial research in connection with design ideation and [39]: Produces and uses paper-based freehand elevation sketches in response to a spatial design matter used
connectedly; and respondent 05’s with [9]: Carries out supporting visuo-spatial research in connection with design ideation and [12]: Produces and uses collage to investigate design ideas used connectedly.

The ends of the diagrams of respondents 01, 11, 03 and 13 all included one or more ideational moves within the category IT-A: Uses paper-based ideation tools response to a spatial design matter, followed by at least one discursive move. However, respondent 01’s diagram ended with a group of connected sub-categories (mostly within IT-A: Uses paper-based ideation tools response to a spatial design matter) and the category IT-D [49]: Uses real materials in response to a spatial design matter followed by a sequence of discursive moves; respondent 11’s with the unconnected sub-category [33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter followed by one discursive move; respondent 03’s with the unconnected sub-category [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter and [9]: Carries out supporting visuo-spatial research in connection with design ideation used connectedly followed by a series of discursive moves; and respondent 13’s with the unconnected sub-category [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter followed by two discursive moves. Respondent 07’s diagram, in contrast, ended with the unconnected category IT-G [56]: Produces one or more physical model/s in response to a spatial design matter followed by a series of discursive moves, whilst respondent 05’s ended with the unconnected sub-category, [65]: Uses CAD software to produce section drawings to in response to a spatial design matter, followed by a comparatively lengthy series of discursive moves.
9.2.5 What discursive moves did each respondent make approaching the discussion of their ideational work and what were the apparent reasons for these? How did the above compare across the sample and for what apparent reasons?

At a category-level, the analysis revealed that the range of discursive moves varied across the sample from three for respondent 03, to seven for respondent 05. In between these extremes, respondent 07 evidenced six and respondents 01, 11 and 13 four. All the respondents evidenced two categories: IM-T: Carries out a move during the interview without apparent encouragement from the interviewer and IM-W [38]: Evaluates his/her design process in an overview. Respondents 03, 05, 07, 11 and 13 also evidenced IM-Y [7]: Appears to be using dismissive words and phrases to describe his/her design ideation tools, whilst respondents 01, 05, 07, 11 and 13 evidenced IM-V: Mentions being guided by internal/external educational experiences. These findings suggested a high degree of homogeneity at category-level across the sample. However, respondents 01, 05 and 07 also evidenced IM-U [13]: Mentions experiencing a design insight through his/her ideation activities, respondents 05 and 07 IM-X [70]: Presents his/her ideation work using multiple platforms, and respondent 05 alone IM-Z [75]: Respondent indicates having a different understanding of the meaning of design than I have. This suggested that there was also a degree of heterogeneity.

**Category IM-T: Carries out a move during the interview without apparent encouragement from the interviewer**

At a sub-category-level, a comparatively wide range of discursive moves was revealed within this category. Respondent 01 evidenced two sub-categories, the lowest number across the sample, whilst respondent 05’s evidenced six, the highest. Respondents 03 and 13 evidenced three sub-categories, and respondents 07 and 11 four each. All the respondents evidenced [68]: Respondent turns a page without apparent encouragement from the interviewer and [69]: Respondent points to a page or an item on a page without apparent encouragement from the interviewer, whilst respondents
03, 13, 07, 11 and 05 also evidenced [71]: Student showcases work without explaining and/or discussing it. In addition, respondents 07 and 05 evidenced [72]: Student appears not to answer the question that was asked; respondents 11 and 05 evidenced [74]: Identifies one or more pages in his/her sketchbook as being not yet complete; and respondent 05 alone evidenced [76]: Student explains and/or discusses work without showcasing it. Thus, at a sub-category-level it appears that there was a basic level of homogeneity, but also a degree of heterogeneity.

The number of moves concerning the sub-categories within the category IM-T: Carries out a move during the interview without apparent encouragement from the interviewer also reveal a wide range. Respondent 01 evidenced seven allocations of [68]: Respondent turns a page without apparent encouragement from the interviewer, plus three prompted page-turns, indicating that whilst eleven pages in total were revealed during the interview, he turned almost twice as many as I either turned or prompted to be turned. Respondent 01 also evidenced three allocations of [69]: Respondent points to a page or an item on a page without apparent encouragement from the interviewer. Respondent 07 evidenced forty-one allocations of [68]: Respondent turns a page without apparent encouragement from the interviewer, plus thirteen prompted page-turns, indicating that, whilst fifty-four pages in total were revealed during the interview, the respondent turned over more than three times as many as I either turned or prompted to be turned. Respondent 07 also evidenced twelve allocations of [69]: Respondent points to a page or an item on a page without apparent encouragement from the interviewer, five of [71]: Student showcases work without explaining and/or discussing it, and two of [72]: Student appears not to answer the question that was asked. The number of unprompted points evidenced may have indicated that respondent 07 was significantly more inclined to lead the tabling of the sketchbook material than respondent 01 was. This, indeed, was my perception during the interviews. In respondent 01’s, I asked initial questions and he answered them; he showed the sketchbook material that he had brought; I asked questions about that material and he answered them; he did not mention work that was missing, identify
certain pages of sketchbook material as incomplete, fail to discuss work that was visible to me or appear not to answer a question that was asked – the discussion focused on what was there. Respondent 07, in contrast, seemed actively to control the tabling of sketchbook material by pointing and page-turning without being prompted, revealing work and not discussing it, and not answering my questions. As was noted above, any interview between two people may be influenced – consciously and unconsciously – by what both participants have brought to the event. Respondent 07’s impact on the direction and pace of the interview appears to have been more overt than respondent 01’s.

Respondent 11 evidenced eighty-five allocations of [68]: Respondent turns a page without apparent encouragement from the interviewer, plus twenty-two prompted page-turns, indicating that, whilst one-hundred-and-seven pages were revealed during this interview, she turned over almost four times as many as I either turned or prompted to be turned. Respondent 11 also evidenced fifty-six allocations of [69]: Respondent points to a page or an item on a page without apparent encouragement from the interviewer (far more than did respondents 01 and 07), and sixteen allocations of [71]: Student showcases work without explaining and/or discussing it and ten of [74]: Identifies one or more pages in his/her sketchbook as being not yet complete (which was not allocated to respondents 01 or 07). These data indicated that respondent 11 may have been significantly more inclined to lead the tabling of sketchbook material than respondents 01 and 07 were. It also indicated that this respondent had in effect at least two sketchbooks: the one present during the interview, and a virtual one that would – or might – contain all kinds of other information that existed at the time only as notes on coasters.

Respondent 03 evidenced twenty-five allocations of [68]: Respondent turns a page without apparent encouragement from the interviewer, plus one prompted page-turn, indicating that, whilst twenty-six pages in total were revealed during the interview, she turned over twenty-five times as many as I either turned or prompted to be turned.
Respondent 03 also evidenced nineteen allocations of [69]: Respondent points to a page or an item on a page without apparent encouragement from the interviewer, and five of [71]: Student showcases work without explaining and/or discussing it. These data indicated that respondent 03 made more unprompted page-turning moves than respondent 01 but fewer than respondents 07 and 11, made more unprompted pointing moves than respondents 01 and 07 but fewer than respondent 11, and showcased work without explaining/discussing it less frequently than respondent 11 but as frequently as respondent 07. However, the ratio of unprompted to prompted page-turns indicated that respondent 03 may have been considerably more inclined to lead the tabling of sketchbook material than respondents 01, 07 and 11 were. During the interview I regarded respondent 03 as having impacted comparatively minimally on the direction and pace of the interview – perhaps no more than respondent 01 – but the above analysis indicates that this respondent may have been playing a much more directive role.

Respondent 13 evidenced fifty-six allocations of [68]: Respondent turns a page without apparent encouragement from the interviewer, plus three prompted page-turns, indicating that, whilst fifty-nine pages in total were revealed during the interview, she 13 turned over in excess of eighteen times as many as I either turned or prompted to be turned. Respondent 13 also showed sixty-nine allocations of [69]: Respondent points to a page or an item on a page without apparent encouragement from the interviewer and five of [71]: Student showcases work without explaining and/or discussing it. These data indicated that respondent 13 made more unprompted pointing moves than any of the respondents discussed thus far, made more unprompted page-turning moves than all the respondents discussed thus far except respondent 11, and showcased work without explaining/discussing it less frequently than respondent 11 but as frequently as respondents 07 and 03. The ratio of unprompted to prompted page-turns indicated that respondent 13 may have been significantly more inclined to lead the tabling of the sketchbook material than respondents 01 and 07 were, but less inclined than respondent 03. That said, the number of unprompted pointing moves suggested that
respondent 13 was more inclined than any of the respondents discussed thus far to
direct my attention whilst discussing the pages revealed.

Respondent 05 evidenced sixty-one allocations of [68]: **Respondent turns a page**
without **apparent encouragement from the interviewer**, plus thirty-seven prompted
page-turns, indicating that, whilst ninety-eight pages in total were revealed during the
interview, she turned over slightly less than twice as many times as I either turned or
prompted to be turned. Respondent 05 also evidenced sixteen allocations of [69]:
**Respondent points to a page or an item on a page without apparent encouragement**
from the interviewer, twenty-one of [74]: **Identifies one or more pages in his/her**
sketchbook as being not yet complete, twelve of [71]: **Student showcases work without**
explaining and/or discussing it and sixteen of [72]: **Student appears not to answer the**
question that was asked. These data indicated that respondent 05 made more
unprompted page-turning moves than all the respondents across the sample except
respondent 11, but fewer unprompted pointing moves than all respondents across the
sample except respondent 01. The ratio of unprompted to prompted page-turns, and
the number of unprompted pointing moves, indicated that respondent 05 may have
been significantly less inclined to lead the journey through the sketchbook material than
all the respondents except respondent 01. Indeed, during the interview with respondent
05, I was aware of feeling impatient about the lack of paper-based freehand sketches
being tabled. Thus, a high number of prompted page-turns could have indicated me
saying in effect, ‘Let’s get a move on.’ Respondent 05 also evidenced that one or more
pages in her sketchbook material were not yet complete significantly more times than
respondent 11 (the only other respondent to whom this sub-category was allocated),
showcased work without explaining and/or discussing it more times than respondents
07, 03, and 13 but less than respondent 11, appeared not to answer the question that
was asked significantly more times than respondent 07 (the only respondent to whom
this sub-category was allocated) and explained and/or discussed work without
showcasing it nineteen times (respondent 05 was the only respondent to whom this
sub-category was allocated). These data may have indicated that, if respondent 05
rarely pointed to the work without having been prompted, this was because during the interview she was often not discussing the work but discussing other matters, such as the software she used, or the time she spent reflecting; or was explaining and/or discussing work that was not visible during the interview and therefore could not point to it. Also, I suspect that during much of the interview respondent 05 treated the sketchbook material as ‘tokens’ that gave permission for discussion to take place without necessarily being the topic or focus of that discussion. Finally, it may have been that respondent 05 was not inclined to discuss the work that she had placed in front of me.

The above analysis indicates considerable heterogeneity across the sample, from respondent 01 who appeared generally to answer the questions asked and to discuss what was there on the table, to respondent 05 who appeared frequently to not answer the questions asked and to spend a comparatively large part the interview not discussing what was there.

Categories IM-U [13]: Mentions experiencing a design insight through his/her ideation activities, IM-V: Mentions being guided by internal/external educational experiences, IM-W [38]: Evaluates his/her design process in an overview and IM-Y [7]: Appears to be using dismissive words and phrases to describe his/her design ideation tools

When I considered these across the sample synoptically with the sub-categories within IM-T: Carries out a move during the interview without apparent encouragement from the interviewer, the analysis revealed a number of interesting possibilities. Respondent 05 evidenced the second-highest number of allocations of IM-U [13]: Mentions experiencing a design insight through his/her ideation activities, and the highest number of allocations of IM-V: Mentions being guided by internal/external educational experiences, IM-W [38]: Evaluates his/her design process in an overview and IM-Y [7]: Appears to be using dismissive words and phrases to describe his/her design ideation tools. These data appear to indicate a respondent who, during the interview, evaluated
her design process, mentioned the role of others in the development of these, mentioned the design insights that were experienced through the ideational activities, and yet used dismissive words to describe this work on a comparatively large number of occasions. In the analysis of the sub-categories within IM-T: Carries out a move during the interview without apparent encouragement from the interviewer above, I noted that respondent 05 showed little inclination to lead the tabling of sketchbook material and, for a considerable part the interview, did not reveal the work I requested to see, discussed work I could not see, and did not answer several questions I asked. It is arguable that, considered altogether, these discursive moves evidence someone who was unsure of the quality and/or suitability of her ideational work, cautious about engaging with it during the interview, and using a range of strategies to attempt to conceal its supposed deficiencies (including protecting the work from too much scrutiny by using dismissive phrases such as, ‘I just tend to cut everything out in a linear sort of, you know…’) whilst seeking to appear to me as a capable and successful spatial designer.

Respondent 01’s diagram showed the highest allocation of IM-U [13]: Mentions experiencing a design insight through his/her ideation activities across the sample, the joint-second-highest number of allocations of IM-V: Mentions being guided by internal/external educational experiences, one of the lowest allocations of IM-W [38]: Evaluates his/her design process in an overview and no allocations of IM-Y [7]: Appears to be using dismissive words and phrases to describe his/her design ideation tools. These data appear to indicate a respondent who, during the interview, mentioned on a comparatively large number of occasions the design insights he experienced through his ideational activities, and the role of others in the development of his design proposals, yet evaluated the design process hardly at all and did not use dismissive words to describe his work. In the analysis of the sub-categories within the categories IM-T: Carries out a move during the interview without apparent encouragement from the interviewer above, I noted that respondent 01 showed little inclination to lead the journey through the sketchbook, and that, for a considerable part the interview, he
revealed the work requested by me, discussed only work I could see, answered the questions asked and so on. It is arguable that, considered altogether, these discursive moves evidence a respondent who had a limited grasp of his own abilities as a design student, but felt quite confident about his work, seldom used discursive moves to attempt to steer the interview away from where I appeared to want it to go, and wanted to convey the impression of being a well-tutored and successful student.

Respondent 03’s diagram showed no allocations of IM-U [13]: Mentions experiencing a design insight through his/her ideation activities and IM-V: Mentions being guided by internal/external educational experiences, and comparatively few of IM-W [38]: Evaluates his/her design process in an overview and IM-Y [7]: Appears to be using dismissive words and phrases to describe his/her design ideation tools. These data appear to indicate a respondent who felt little inclination to evaluate or criticise her work, and did not mention the design insights she experienced, nor seek to convey the impression that she had received guidance as a student. That said, in the analysis of the sub-categories within the categories IM-T: Carries out a move during the interview without apparent encouragement from the interviewer above, I noted that that respondent 03 may have been considerably more inclined to lead the journey through the sketchbook material than any other respondent across the sample. Perhaps, rather than using words and phrases to create the impression of a well-tutored and successful student, she was seeking to use the sketchbook material? During the interview, I regarded respondent 03 as having impacted comparatively minimally on it, however the above analysis indicates that she may have been playing a much more directive role. It is arguable that, considered together the discursive moves allocated to respondent 03 begin to evidence someone who was comparatively confident as a design student but used unprompted page-turning and pointing moves to influence the direction of the interview.

Respondent 07’s diagram showed comparatively few allocations of IM-U [13]: Mentions experiencing a design insight through his/her ideation activities, IM-W [38]: Evaluates
his/her design process in an overview and IM-Y [7]: Appears to be using dismissive words and phrases to describe his/her design ideation tools, but the joint-second-highest number of allocations of IM-V: Mentions being guided by internal/external educational experiences. These data appear to indicate a respondent who was confident as a student, willing during his interview to mention the support provided by others on a comparatively large number of occasions, but not inclined to evaluate or be critical of his work, nor to mention the design insights experienced through his ideational activities. That said, in the analysis of the sub-categories within IM-T: Carries out a move during the interview without apparent encouragement from the interviewer, I noted that respondent 07 seemed actively to be controlling the tabling of sketchbook material by pointing and page-turning without my prompting him, revealing work and not discussing it, and not answering my questions. Respondent 07’s impact on the direction and pace of the interview thus appears to have been notably overt. Perhaps, rather than using words and phrases to convey to me that he was a well-tutored and successful student, this respondent was seeking to use his sketchbook material? It is arguable that, considered altogether, the discursive moves allocated to respondent 07 begin to evidence someone who, like respondent 03, was comparatively confident as a design student, but used unprompted page-turning and pointing moves to influence the direction of the interview.

Respondent 13’s diagram showed no allocations of IM-U [13]: Mentions experiencing a design insight through his/her ideation activities, and comparatively few of the categories IM-W [38]: Evaluates his/her design process in an overview, IM-Y [7]: Appears to be using dismissive words and phrases to describe his/her design ideation tools and IM-V: Mentions being guided by internal/external educational experiences. These data appear to indicate a respondent who, during her interview, made hardly any use of discursive moves to filter what was revealed about the work. The data gave me a sense of someone who was extremely confident as a student, and did not mention the role played by others in the development of her design proposals, evaluate or criticise her work, nor seek to convey the impression using words and phrases that
she was a successful student. That said, in the analysis of the sub-categories within IM-T: *Carries out a move during the interview without apparent encouragement from the interviewer*, I noted that respondent 13 made more unprompted page-turning moves than all the respondents across the sample except respondent 11, made more unprompted pointing moves than any of the respondents across the sample, and showcased work without explaining/discussing it less frequently than respondent 11 but as frequently as respondents 07 and 03. This suggested that respondent 13 may have been significantly more inclined to lead the journey from one page to the next in her sketchbook material than respondents 01 and 07 were, but less inclined than respondent 03. That said, the number of unprompted pointing moves suggested that this respondent was more inclined than any of the respondents to direct my attention whilst discussing the pages she revealed. Perhaps, rather than using words and phrases to convey to me that she was a well-tutored and successful student, this respondent was seeking to use the sketchbook material? It is arguable that, considered altogether, the discursive moves allocated to respondent 13 begin to evidence someone who, like respondents 03 and 07, was comparatively sure of her own abilities as a design student, but used unprompted page-turning and pointing moves to influence the direction of the interview.

Respondent 11’s diagram showed no allocations of IM-U [13]: *Mentions experiencing a design insight through his/her ideation activities* and comparatively few of IM-Y [7]: *Appears to be using dismissive words and phrases to describe his/her design ideation tools*. That said, it showed the second-highest number of allocations of IM-W [38]: *Evaluates his/her design process in an overview* and IM-V: *Mentions being guided by internal/external educational experiences*. These data appear to indicate a respondent who, during her interview, made selective use of discursive moves to filter what was revealed about her work. The data gave me a sense of someone who, whilst evidencing an evaluative approach and mentioning receiving the guidance of others, was inclined to let the work ‘speak for itself’ without feeling the needed to mention when and where design insights were experienced or speak of the work dismissively.
That said, in the analysis of the sub-categories within IM-T: Carries out a move during the interview without apparent encouragement from the interviewer, I noted that that respondent 11 may have been significantly more inclined to lead the journey through the sketchbook by means of unprompted page-turning and pointing moves than all the other respondents across the sample. The data also indicated that she had, in effect, at least two sketchbooks: the one tabled during the interview and a virtual one that would – or might – contain all kinds of other information that existed at the time only as notes on coasters. This suggested that respondent 11 may have been less keen to let the work ‘speak for itself’ than I had conjectured above, because a lot of that work was missing. It should be noted, though, that this respondent rarely mentioned during the interview these notes on coasters. It is arguable that, considered altogether, the discursive moves allocated to respondent 11 continue to evidence a respondent who, like respondents 03, 07 and 13, was comparatively sure of her own abilities as a design student, but, more than all the other respondents across the sample, attempted to influence the direction of the interview.

The above analysis indicated that, during their interviews, the respondents may to a greater or lesser extent have interpreted themselves and their sketchbook material for me using various combinations of discursive moves. To me, these interpretations were all translations as discussed in chapter 3.0 Conceptualisation. If it is accepted that an interview is not a simple transfer of information from respondent to interviewer, but a series of translations during which the participants edit and modify not just the information they reveal but also themselves, the discursive moves begin to indicate how these translations may be taking place.

Was there a pattern that linked discursive moves to, say, academic level? When I began to analyse the diagrams it was with the expectation that both Level 4 students would be found to have used comparatively few unprompted page-turning and pointing moves and showed a tendency to be dismissive of their work as they obediently and nervously revealed their sketchbook material; both Level 5 students to have used a comparatively larger number of
unprompted page-turning and pointing moves and a more evaluative approach as they led me through their expanding sketchbook material with greater confidence; and both Level 6 students to have used an extremely large number of unprompted page-turning and pointing moves and revealed considerable evidence of experiencing design insights as they led me through their sketchbook material in a bold, directive manner. It appears that this expectation was misplaced. Some respondents from all three academic levels evidenced comparatively high levels of confidence (respondents 01 and 07 (Level 4), respondents 11 and 03 (Level 5) and respondent 13 (Level 6)) whilst respondent 05 (Level 6) appears to have revealed a marked lack of it; the highest number of design insights were evidenced by respondent 01 (Level 4); and respondent 05 (Level 6) appears to have revealed the highest tendency to be dismissive of the sketchbook material discussed.

Was there an obvious pattern that linked discursive moves to, say, institution? When I began to analyse the diagrams it was with the expectation that students from my own university would reveal a greater inclination to be led during the interview, and students from elsewhere would reveal a consistently lower inclination. It appears that this expectation was misplaced. On the contrary, respondents 05 and 03 from my own institution appear to have been highly inclined to follow their own leads during the interview, but then, so, apparently, was respondent 13 (Level 6) from the former polytechnic, and 07 (Level 4) from the high-ranking institution, whilst respondent 01 (Level 4) from my own institution evidenced considerably more inclination to be led.

The final stage of ‘timeline’ diagram analysis involved examining the locations of categories and sub-categories of discursive moves in order to ascertain whether these provided evidence of one or more patterns. In this context, as with the ideational move analysis above, I did not require a pattern necessarily to be a lengthy sequence of exactly repeated categories and/or sub-categories. It might instead consist of shorter, more loose, more fleeting combinations which occur more than once. In general, I found no evidence of credible patterns concerning IM-U [13]: Mentions experiencing a design insight through his/her ideation activities, IM-V: Mentions being guided by internal/external educational experiences,
IM-W [38]: Evaluates his/her design process in an overview or IM-Y [7]: Appears to be using dismissive words and phrases to describe his/her design ideation tools, except the following:

I noted that in respondent 07’s ‘timeline’ diagram the discursive moves did not generally occur in comparatively lengthy sequences but in comparatively short ones. This may have been further evidence that this respondent was inclined to talk about the work being shown, but not about its wider context (for example, how others supported it, and what the respondent thought about it), and was inclined to discuss what had been brought to the interview, but not what had not been brought.

In respondent 05’s diagram, IM-W [38]: Evaluates his/her design process in an overview and IM-U [13]: Mentions experiencing a design insight through his/her ideation activities appeared in close proximity on only five occasions and IM-W [38]: Evaluates his/her design process in an overview, [29]: Is being guided by internal educational experiences only once; and IM-U [13]: Mentions experiencing a design insight through his/her ideation activities and IM-V: Mentions being guided by internal/external educational experiences did not occur in close proximity at all. That said, IM-W [38]: Evaluates his/her design process in an overview and IM-V: Mentions being guided by internal/external educational experiences (but not IM-U [13]: Mentions experiencing a design insight through his/her ideation activities) are frequently found just before and/or just after a page-turn, and IM-U [13]: Mentions experiencing a design insight through his/her ideation activities, IM-V: Mentions being guided by internal/external educational experiences and IM-W [38]: Evaluates his/her design process in an overview occur close to [74]: Identifies one or more pages in his/her sketchbook as being not yet complete and/or [76]: Student explains and/or discusses work without showcasing it quite frequently. It could be argued from these data that respondent 05 does not just use more discursive moves but uses them in different combinations when compared to the other respondents. Alternatively, these data may instead have been an indication of how often the respondent revealed the sketchbook material to be incomplete or explained/discussed work without showing it.
The diagrams of respondents 01, 07, 11 and 13 appeared to evidence an adjacency involving IM-V: *Mentions being guided by internal/external educational experiences*, IM-W [38]: *Evaluates his/her design process in an overview* and the sub-category [68]: *Respondent turns a page without apparent encouragement from the interviewer*, and respondent 03’s diagram appears to evidence an adjacency involving IM-W [38]: *Evaluates his/her design process in an overview* and [68]: *Respondent turns a page without apparent encouragement from the interviewer*, but respondent 05’s diagram does not share these characteristics. This suggests that, perhaps, apart from respondent 05, there was a loose similarity between the way the other respondents accounted for and contextualised the work in their sketchbooks, and navigated through the interview, whilst respondent 05 indicated a somewhat different approach.

In respondent 07’s diagram, the discursive moves appear not in comparatively lengthy sequences but in comparatively short ones (for example, whilst respondent 05’s diagram shows series of six, eight, nine – and more – discursive moves in a row, and respondent 01’s diagram shows series of up to five, respondent 07’s diagram shows no more than four). This may further evidence that respondent 07 was inclined to talk about the work being shown, but not to say much about its wider context (for example, how others supported to it, what thoughts the respondent had about it), and was inclined to discuss what had been brought to the interview, but not what had not been brought. It should also be noted that respondent 07’s diagram shows that IM-U [13]: *Mentions experiencing a design insight through his/her ideation activities* occurred in both cases just before a prompted page turn.

Respondent 05’s not identifying many instances of design insight, as discussed above, may not have revealed a hidden ‘truth’, but accorded with the respondent’s account of her methodology, which revealed little design insight over the course of much of the project, until she climbed under a duvet and then something amazing happened. IM-V:
Mentions being guided by internal/external educational experiences was allocated to respondent 05 more than any other respondent (six times).

It could be argued from the data that, when compared to the rest of the sample, respondent 05 did not only use more discursive moves, but also used them in different combinations. This may simply have been an indication of how often the student revealed the sketchbook material to be incomplete, or explained/discussed work without showing it. Thus, whilst respondents 01, 07, 11 and 13 appeared to evidence a connection between IM-V: Mentions being guided by internal/external educational experiences, IM-W [38]: Evaluates his/her design process in an overview and [68]: Respondent turns a page without apparent encouragement from the interviewer, and respondent 03 a connection between IM-W [38]: Evaluates his/her design process in an overview and [68]: Respondent turns a page without apparent encouragement from the interviewer, respondent 05 did not share these characteristics. Why might this be? Perhaps, there was a loose similarity between the way the other respondents accounted for the work in their sketchbooks, contextualised that work and navigated through the interview, and respondent 05 revealed a markedly different approach. Perhaps respondent 05, more than any other respondent demonstrated the use of ‘tokens’: items of work tabled but not discussed in great detail (or at all), and/or was so disorganised, forgetful, evasive or something else that she simply ended up demonstrating a different ideational approach by talking too much – but not about the work on the table – and showing too little.

9.2.6 How fully were the research questions answered?

The above suggests that the research questions were answered thoroughly. However, as is discussed in 9.3.4 Positioning the findings, the grounded theorising took me beyond those questions to realise that another research question needed to be answered: to what extent could discursive moves satisfactorily be understood independently from ideational moves, or vice versa? This was another translation (Law, 2007; Latour, 1999; Callon, 1986) within this
study, and it was an extremely important one – see section 9.3.4.7 Discursive and ideational moves as interconnected.

9.3 Main findings

The main findings of this study can be summarised as follows.

9.3.1 Ideational moves

The data analysis and grounded theorising have revealed that respondents across the sample made considerable use of paper-based freehand sketching during ideation (although, please note the discussion in chapter 10. Limitations to the study). They have also countered my suspicion, at the beginning of this study, that students at my own institution preferred producing and using hand-written text (such as ‘mind maps’) to paper-based freehand sketches during ideation, and producing digital rather than paper-based freehand drawing.

In section 4.14 Identifying a core category, I quoted the descriptive story that had emerged during ‘evolved’ grounded theorising as a possible answer to the questions, ‘What keeps striking me over and over? What comes through, although it might not be said directly?’ (Strauss and Corbin, 1998, p. 148):

‘What keeps striking me about these interviews is that, although different students use a similar range of ideational moves apparently with similar understanding, they appear to use them with different degrees of connectivity and have different levels of confidence. What also strikes me is that connectivity and confidence appear to be linked closely: a ‘high score’ in one is always followed by a ‘high score’ in the other.’

During the constructivist grounded theory phase of this study, analysis of the categories, sub-categories and dimensions indicated that the connectedness of the ideational moves used by the respondents was not the key to understanding the sketchbook material. Indeed, the
sketchbook material and approaches to ideation were found to be extremely diverse. The range of categories and sub-categories of ideational move evidenced in each respondent’s data, the number of allocations of each, and the connectedness of each, indicated that there was a basic commonality – or ‘core’ – across most or all of the sample, but there appeared also to have been a considerable amount of heterogeneity in the respondents’ approaches. More importantly, perhaps, this basic ‘core’ seemed not to have resulted in design ideas that were innovative or even unexpected, but in more – or less (depending on how methodically it was used) – thoroughness in the respondents’ design proposals. It should be reiterated here that my aim during this study was not to evaluate the quality of the respondents’ design outcomes. Nonetheless, as the study progressed the notion of design risk-taking kept returning to my reflexive practice. It became apparent that the design outcomes I was being shown during the interviews seemed in all-but-one case to be comparatively predictable. For example, early on during my interview with respondent 07, he revealed secondary research into the theoretical writings of Peter Eisenman, which was followed by design proposals that, in my opinion, bore superficial resemblance to Peter Eisenman’s architecture. Meanwhile, Respondent 13’s ideational work led to what I regarded as a comparatively elegant, thorough but unsurprising exploration of layered, inside-outside relationships in a domestic context. Both respondents appeared to have approached the design challenges with considerable efficiency, but I found the outcomes to be somewhat predictable. Only respondent 05’s work evidenced unexpected results, and these appeared to have been provoked by two categories of ideational move not part of the basic ‘core’ – IT-F [64]: Generates ideas in response to a spatial design matter by chance through an experiential, sensorial approach and IT-D [49]: Uses real materials in response to a spatial design matter – both of which seemed to be used comparatively fleetingly but to powerful effect.

Whilst being interviewed, respondent 08 said, ‘...the thing I love most about sketching on paper is that there is room for chaos.’ I was both interested and excited to hear this. Professional experience, informed by the literature review, had led me to believe that innovation was fuelled by the designer experiencing periods of uncertainty, confusion and frustration during ideation, and having encounters with the unexpected and random
(including, of course, the ‘fuzzy stuff’ (Goldschmidt, 1991, p. 131) as found in paper-based freehand sketches). The word ‘chaos’ seemed to encapsulate these characteristics, and to resonate with the term ‘unstructured freedom’, and Herman Herzberger’s phrase ‘wild thinking’, which are found on the V&A’s website, *Architects and their Sketchbooks* (V&A, 2017). However, I found that the sketchbook material examined across the sample did not evidence what might be regarded as periods of uncertainty, confusion and frustration, nor encounters with the unexpected or random, except in the work of respondent 05 which indicated a student who on occasions really did not know what she was doing, who found her methodology at times confusing and frustrating, and who was genuinely surprised by certain design outcomes. All the other respondents appeared to have used the basic ‘core’ of seventeen sub-categories, and two categories that do not contain sub-categories, to produced design outcomes that to me appeared to a greater or lesser extent thoroughly considered, and credible, but not innovative. Although their methodologies evidenced heterogeneity, this appeared not to lead to distinctive design outcomes.

### 9.3.2 Discursive moves

The data on discursive moves indicated that the respondents handled their interviews in a variety of ways: respondents 01 and 07 as comparatively open and honest rapporteurs who appeared to use the sketchbook to explain their approach to ideation; respondents 11, 03 and 13 as students who to a greater or lesser extent sought to direct what was shown and discussed, for reasons that could be speculated on but were ultimately unclear; and respondent 05 as someone who was somewhat chaotic, puzzling and perhaps even evasive, and who appeared to use the sketchbook material as a ‘token’ seldom to be referred to during the discussion. These characteristics lead to an important point. By showing but not discussing work they had brought, not showing or discussing work they had brought, discussing work they had not brought, and/or pointing to and discussing certain items but not others, the respondents significantly influenced how the sketchbook material was understood.

If the respondents’ behaviour during the interviews indicated certain performative characteristics, I now understand that my approach did too. My attempts to appear as a
curious, non-critical, easy-to-talk-to academic during each interview have already been noted. My performance also varied across the interviews – for example, as I began to be concerned about whether the data was worth collecting, the camcorder power and memory capacity were sufficient, the video-recordings could be transcribed in sufficient time, and so on. Other matters also impacted on my performance, including an argument between non-participants that took place near to the location of the interview with respondent 03, and a tense encounter with my then-line manager that took place just before the start of the interview with respondent 04. Moreover, like the respondents, I also made selections from the sketchbook material, for example by choosing to discuss what I regarded as an interesting-looking paper-based freehand sketch whilst ignoring one that appeared less interesting. Hand-written or word-processed text was never read out loud fully word-for-word, nor were pages of sketches and photographs discussed fully item-by-item: not by me, nor the respondents. These findings argue that the understanding gained during the interview was the outcome of interactions between the respondent, myself, the sketchbook material and a range of other human and non-human actors. Without the respondent being present during the interview the sketchbook material would arguably have become by-and-large a black box: a collection – mostly cryptic – of images and words which may, or may not, describe the creative process comprehensively. With the respondent present it may have become less of a black box, but, depending upon how the respondent, myself and other actors within the network performed, it may to some extent have remained one: as was noted above, the role of respondent 05’s sketchbook material in the creative process was mysterious throughout the interview.

9.3.4 Positioning the findings

9.3.4.1 The use of ANT in spatial design research

There are several examples of ANT being used in spatial design research. For instance, Teh’s (2013) study combines ANT with a given design technique in order to identify and evaluate new types of urban space. In this, ANT is used as a way of conceptualising both the urban environment as a complex network of material and social actors, and the design technique used to facilitate creative speculation concerning this complex network, leading to
the generation of innovative proposals. The study contrasts with mine in that Teh uses ANT as a way of informing a brief or programme – in other words, as part of a design methodology – whilst I have used it as a way of understanding the data and the grounded theorising – in other words as part of a research methodology. Also, whilst Teh’s and my studies both take from ANT the notion of human and non-human actors forming complex, fragile and temporary networks, mine also utilises the ANT concepts of translation (Law, 2007) and circulating references (Latour, 1999) in particular to understand the research process, and acknowledges that the research outcomes, thesis, viva voce and subsequent publications are further translations. Thus, unlike Teh, I have used ANT as a way of conceptualising the entire study, not just as the source of the initial data.

I find Kraal’s (2007) study much more interesting. It seeks to devise automatic speech recognition software (ASR) that is both easy to use and perceived as worth using. Kraal’s research methodology, like mine, includes interviews as data sources, and he analyses the data using, inter alia, a grounded theory approach. Moreover, like my study, Kraal’s uses ANT to examine ‘...the mechanics of how co-evolution of action, locale and social world occurs...’ (Kraal, 2007, p. 3), and translation plays a major role in Kraal’s research. This he uses to analyse the fieldwork data, discussing how his respondents are translated by using the ASR, how their work is in itself translated, and how the software is translated. Kraal’s (2007) study, though, is different from mine. In addition to the data sources and methodological tools mentioned above, his study also includes the observation of people who are using ASR; he utilises traditional grounded theory (informed Glaser and Strauss, 1967); and he uses this in combination with the Locales Framework (Fitzpatrick, 2003) – in particular the interaction trajectory aspect (Graham et al., 2005). Moreover, from ANT he also utilises enrolment, and the associated concept of inscription, which I have argued above are not applicable to my study. There are significant parallels, but my work goes further. Kraal illustrates how translation may change how technology is used, noting Law’s (2003) account of Akrich’s work concerning machines that create fuel sources – briquettes – out of recycled materials: these were constructed in Sweden and exported to Nicaragua, but were used in quite different ways in each country (Kraal, 2007). I have argued
that the students' sketchbook material may also be ‘almost unrecognisable’ in different settings, but that this will be the case even though – unlike in the case of the briquettes – the students are present in each of these settings. The reason for this, I contend, extends Kraal’s argument that ‘...using software is a situated experience.’ (Kraal, 2007, p. 10): discussing sketchbook material with another person is also situated experience. Furthermore, Kraal’s view of translation differs from mine. In this study, I accepted that my presence in the data collection and analysis caused its own translations, and I was translated by being part of the network, but it would appear that Kraal (2007) discusses ANT as something that helped him to understand the data whilst he remained an uninvolved observer who was outside of the network.

González’s (2013) study also has parallels with mine. He uses ANT to understand and explain how people participate in online communities. Like me, he obtained data through face-to-face interviews with respondents, which were then transcribed, and he used ANT – inter alia, translation – to inform the analysis of the data. However, my study is distinct from González’s in several ways. I used ‘evolved’ and constructivist grounded theory to analyse the video-recordings and transcripts of the interviews, whilst González used thematic analysis, informed by the work of Braun and Clarke (2006). In my study, ANT emerged over time as a means of analysing and conceptualising the data, but it was clearly intrinsic to González’s – indeed, it featured in one of his research questions: ‘What do the theoretical resources from ANT reveal about participation in the online community that is the focus of this study?’ (González, 2013, p. 127). Looking at ANT more widely, González lists a number of publications that discuss its use in research contexts (González, 2013). My study goes beyond these in that, although it concerns networks of actors, it examines the sketchbook material and how it is discussed in an interview setting. This is arguably a process-based investigation (although technology, in the form of the cam-corder, laptop and other items remains present), which connects it to Latour’s (1999) study that examined translations occurring during a study involving researchers, soil sample boxes, colour swatches and sketches – all arguably low-technology items. Finally, as I have noted above concerning Teh’s (2013) and Kraal’s (2007) studies, González discusses ANT as something that helped
him to understand the data whilst he remained an uninvolved observer who was outside of
the network. In my study I have accepted that my presence in the data collection and analysis
caused its own translations, and I was translated by being part of the network.

9.3.4.2 ANT and causality

In my study, there is speculation that the use of ANT to analyse the video-recordings of
the interviews – particularly the respondents’ discursive moves as identified in those video-
recordings – may give insights into why the respondents behaved as they did. But can ANT
be used to determine causality? Ponti’s (2012) discussion on issues concerning the
determination of causality by the analysis of sequences of events as described in narratives
provides a helpful insight here. Ponti notes that the

‘...evidentiary status of causality attributed to narratives may be taken for granted when
using actor-network theory...as a methodology, because ANT descriptions and
explanations cannot be separated.’ (Ponti, 2012, p. 1)

However, in contrast to my study, hers brings together ANT and event structure analysis
(ESA), and interprets main ESA concepts using terms derived from
ANT. ESA seeks to understand and explain how people use cognitive maps to ascribe
outcomes to sequences of events, and also to analyse actual sequences of events that lead
to specific outcomes: ‘The focus is on a particular outcome and the way in which preceding
events have contributed to it.’ (Ponti, 2012, p. 1) Ponti argues that the resources provided by
ANT and ESA ‘...tap into the potential of narratives to be simultaneously descriptive and
explanatory by fostering an explicit deployment of temporal order, connectedness, and
unfolding of events.’ (Ponti, 2012, p. 1)

9.3.4.3 ANT and performance

Law and Singleton’s (2003) paper on Alcoholic Liver Disease (ALD) provides fascinating insights into
the notion of performance, and the creation of multiple realities. They argue that the construction of
any network is performative (ibid.): ‘...performances make realities, and the knowledge of those realities...’ (Law and Singleton, 2003, p. 11) This underlines my statements in section 9.3.2 Discursive moves that each participant in the interviews conducted as part of this study was engaging in acts of performance, and that it should not be assumed that each actor produced only one performance. Indeed, regarding this last point, Law and Singleton note that the attempt by Dr Warrington, a consultant gastroenterologist

‘...to perform ALD and its treatment in a particular way draws on and mobilises the knowledges and the realities both of medical science and medical organisation. It is a double performance.’ (Law and Singleton, 2003, p. 4)

In section 9.3.2 Discursive moves, I stated: ideational moves cannot satisfactorily be discussed independently from discursive moves, or vice versa, because the respondent and I were a fundamental part of the process of understanding the creative work. Law and Singleton’s (2003) paper suggests this point should be taken further: a student’s sketchbook material is performed, and that performance may be understood, in part, by examining both the discursive and ideational moves.

9.3.4.4 ANT and the problem of difference

I began this study anticipating that each interview was going to be, overall, ostensibly the same event during which each respondent would bring their sketchbook material to be discussed, examined and understood. The data and analysis revealed that the interview participants ‘...collectively tend[ed] to perform difference, multiplicity...’ (Law and Singleton, 2003, p. 10) – thus, each interview was different. But Law and Singleton (2003) take the notion of ‘differentness’ further. They state that ALD appears not to be one thing only, but a multitude of partially-linked symptoms or challenges. This leads to a fascinating result: the treatment of ALD involves multiple realities. Thus, ‘...Dr. Warrington and the Registrar perform ALD...[a]s not being one thing at all. Instead. [sic] ALD (and the treatment of ALD) is performed as not any thing.’ (Law and Singleton, 2003, p. 5) As a
consequence,

‘...subtly – or not so subtly – different realities may be performed into being in different locations. This is what...Annemarie Mol calls the problem of difference...Even things that are ostensibly the same turn out to be different or multiple.’ (Law and Singleton, 2003, p. 6)

Discussing Mol’s (2001; 1998) work further, Law and Singleton state:

‘...we need to be very cautious about assuming that medicine (or any other region) is really coherent: [Mol’s]...studies show...that lower limb atherosclerosis is performed in different ways in the different departments of the same hospital. Thus in her analysis the average case conference is a more or less tricky attempt to patch together different atheroscleroses to produce a practical decision about intervention.’ (Law and Singleton, 2003, p. 8)

It is my contention that the sketchbook material presented and discussed by any respondent during this study (and also, perhaps, by any student in any academic setting) is, like the treatment of ALD, not one thing, but is performed within the temporary network of human and non-human actors: each revealing of that sketchbook material is a different reality. Law and Singleton (2003) contend that these different realities have significant implications for how success is gauged in the NHS, and they add: ‘...we are likely to find that there are endless problems of co-ordination.’ (Law and Singleton, 2003, p. 6) There can be little doubt that those involved in academic assessment face similar challenges of coordination as they attempt to assess multiple realities consistently. It may be contested that coherence can still be achieved, but this, ‘...is itself an enactment.’ (Law and Singleton, 2003, p. 8)

9.3.4.5 Research into sketchbook material

Whilst conducting this study, I have been able to refer to a substantial body of literature concerning paper-based freehand sketches and sketching (see chapter 2. Literature
There appear to have been somewhat fewer investigations into the production and use of sketchbook material *per se*, but several of these have helped me to position my research. Gilbert (1998) questioned the premise that, in an academic setting, such material was ‘…a personal response that could not be assessed.’ (Gilbert, 1998, p. 255) Earlier in his teaching career, he had noticed that his art graduate students produced ‘…good drawings but little more: giving evidence of their previous education rather than their development.’ (ibid.) These drawings he regarded not as evidencing creative process, but skill at manual image-making *(ibid.)*. His non-specialist students, in contrast, produced work that ranged widely in quality, two of which ‘…gave evidence of…enormous development.’ *(ibid.)* It is tempting to see this variety as independent evidence supporting my finding that sketchbook material shows considerable heterogeneity. However, Gilbert’s participants were not spatial designers, but trainee primary teachers studying art tuition on one-year Post Graduate Certificate of Education courses, and practising primary teachers studying art tuition on Certificate of Advanced Studies in Education courses, so our samples are not comparable.

In Brereton’s (2009) publication, *Sketchbooks: the Hidden Art of Designers, Illustrators and Creatives*, a range of practitioners outline how they perceive and use sketchbook material, describing it, *inter alia*, as ‘…a visual diary…’ (Brereton, 2009, p. 6), ‘…simply a place to play…’ *(ibid.)*, ‘…a freedom to experiment…’ (Brereton, 2009, p. 7), and ‘…like a valve, a pressure release system.’ *(ibid.)* It is, again, tempting to see these statements as independent evidence supporting my finding that sketchbook material is heterogeneous, but Brereton’s participants were neither spatial designers nor undergraduates, so he and I have not been examining the same thing. It is also tempting to regard the words ‘play’, ‘freedom’ and ‘experiment’ as occupying similar territory to respondent 08’s phrase, ‘room for chaos’, but Brereton does not provide sufficient illustrations to allow this to be evaluated.

The above papers provide a further – and, in my opinion, more helpful – insight regarding the positioning of my research: both authors appear to regard sketchbook material as offering authentic insights into creative process. Parker (2005) and Clayton and Wiesenthal (1991) express similar views. Parker (2005) studied how students across several art and design
courses used sketchbook material in response to given tasks, and she regarded such material as providing evidence of the exploration of ‘...innovative and original ideas...’ (Parker, 2005, p. 186) and allowing each design methodology to be understood. Clayton and Wiesenthal’s (1991) paper discusses the impact of new digital media on the production of sketchbook material. What, digitally, was new twenty-six years ago is new no longer, but my interest is not in what these authors say about outdated software packages but in what they say about the history and uses of sketchbook material (ibid.). Their discussion spans the work of, inter alia, Leonardo da Vinci, Le Corbusier, Ludwig Mies van der Rohe, Louis Kahn and Michael Graves, and, overall, is predicated on the presumption that sketchbook material documents ideational activity accurately – thus, ‘[a] sketchbook...is a model of memory and the creative process which achieves insight.’ (Clayton and Wiesenthal, 1991, p. 115)

Altogether, Brereton’s (2009), Clayton and Wiesenthal’s (1991), Gilbert’s (1998), and Parker’s (2005) publications appear to regard sketchbook material, once shared with others as, in effect, private thoughts made public, and thus having the candour of a secret diary. Indeed, it will have been noted that Brereton quotes the phrase ‘...a visual diary...’ (Brereton, 2009, p. 6) as one description of sketchbook material. Once this view is adopted, it is in my opinion reasonable to assume that a student’s sketchbook material shows what they really did during a design project, and to assess it as evidence of design process. However, this is at odds with my position on completion of my study: that within my sample, sketchbook material, and discussions on it with the student designer, were performed; there was no one sketchbook, but a new performance every time it was revealed and discussed.

Regarding the positioning of my research, Brereton’s book has more to offer. He notes how, whilst examining his participants’ sketchbook material,

‘...I started asking myself, how do I make sense of what I am looking at to others? They won’t be seeing the whole sketchbook, just a part of it...In order to make sense of the large selection of sketchbooks, I felt I needed to add filters. Otherwise nothing would make sense.’ (Brereton, 2009, p. 6)
These observations suggest that he thought the complete sketchbook could be understood, if only it were visible. My study has called this notion into question – see section 9.3.4.5

**Difficulties of assessing sketchbook material.** Brereton’s statements also indicate that he was selecting from the sketchbook material in order for it to ‘…make sense.’ *(ibid.)* I suspect that the various artists and designers contributing to his book had also filtered their work – perhaps before he got to see it, perhaps whilst they were showing it to him – but not necessarily to make the same kind of sense as the one Brereton intended. This takes us back to my study, where, during their interviews, my respondents, by pointing, page-turning, mentioning certain things but not others, and answering certain questions but not others, were also making selections – as was I. I mentioned above that my analysis of these discursive moves has led to the finding that, within my sample, the sketchbook material was performed, and its revelation and discussion during the interviews were performances. Brereton’s publication suggests that similar performances were taking place across his sample, but his discussion does not address this. Indeed, the blurb to the book states that the contents ‘…will give readers a direct and unmediated insight into the process of research and creation.’ My study has indicated that a discussion about sketchbook material is far from unmediated

### 9.3.4.6 Co-construction of assessed work within spatial design education

It was noted in chapter 4.0 *Research methodology* that constructivists assert that people ‘…create or construct their own new understandings or knowledge through exploring what they already know and believe as well the ideas, events, and activities with which they come in contact…’ *(Rami et al, 2009, p. 9)* Within an educational context, constructivists thus perceive the students in a classroom setting as constructing their learning both individually and collectively, and the tutor as the learning-leader and facilitator *(Bovill, 2014)*. This brings us to the notion of co-construction, which is defined as ‘…the joint creation of a form, interpretation, stance, action, identity, institution, skill, ideology, emotion, or other culturally meaningful reality…’ *(Jacoby and Ochs, 1995, p. 171)* Co-construction of learning is well-
established within art and design education where students make continual decisions about what steps to take during their project work, but are guided by a broad overall teaching and assessment framework (Orr and Shreeve, 2018). This is a model with which I am very familiar through my professional practice: the tutor sets an initial framework for learning and assessment (the brief), the students attempt to engage with this and produce work, the tutor responds to and attempts to steer that work by means of formative feedback, and the assessment endeavours to take into account that the tutor and the student co-constructed the work together. However, it should be noted that co-construction may happen without the participants wanting or even being aware of it, and ‘…does not necessarily entail affiliative or supportive interactions.’ (Jacoby and Ochs, 1995, p. 171) The above publications suggest that, when the sketchbook material was being performed within the temporary network of human and non-human actors, the human actors, in effect, co-constructed it, perhaps without realising they were doing so.

9.3.4.7 Discursive and ideational moves as interconnected

During much of this study, I regarded discursive moves and ideational moves as largely unconnected groups of categories and sub-categories, the former concerning the sketchbook material and the latter the respondents’ behaviour and comments during the focused interviews. During the latter stages of my research it became clear that ideational moves could not satisfactorily be understood independently from discursive moves, or vice versa, for several reasons:

1. The discursive moves suggested that the respondent was abstracting from his/her ideational moves during the discussion on them: making choices by directing my attention towards certain items of sketchbook material and away from others, using placing-for and directing-to techniques. I was also abstracting from the ideational moves by using my own placing-for and directing-to techniques.

2. These abstractions indicate that the sketchbook material was being performed during each focused interview: there was no one ‘true’ version of it – as a document of
ideational moves it was being co-constructed by each participant using discursive moves, perhaps without those participants realising that this was happening.

3. Once we conceive sketchbook material not as a single, fixed ‘thing’ but as one of a number of human and non-human actors within a delicate and temporary actor-network, we can see that, just as the performance of the camcorder impacted on understanding of the ideational moves (by revealing some items of sketchbook material, and obscuring/concealing others) so each human participant’s discursive moves impacted on it too. The video-recordings, by capturing a version of each collection of sketchbook material, suggest these documents of ideational moves were fixed and reproducible, but this is not the case: the actor-network resulted in a series of performative events, but other actor-networks could provoke different discursive moves, resulting in the ‘same’ ideational moves being understood in quite other ways.

9.3.4 Impact on my professional practice

As this study has been carried out in partial fulfillment of the requirements for the award of Professional Doctorate, its over-arching aim has been to inform my professional practice as a spatial design academic. It is thus appropriate, as this chapter comes to an end, to appraise how the study has impacted on that practice. I have noted its impact in five key ways: seeking to enhance speed and fluency in the use by spatial design students of ‘core’ of categories and sub-categories of ideational move; encouraging students to make ideational moves that are not part of the ‘core’ of categories and sub-categories; encouraging students to create ‘room for chaos’ by experiencing periods of uncertainty, confusion and frustration, and encounters with the unexpected; enhancing the students’ ability to use categories and sub-categories of ideational move connectedly; and keeping in mind the difficulties of assessing sketchbook material effectively.
9.3.4.1 Enhancing speed and fluency in students’ use of ‘core’ categories and sub-categories of ideational move

Having begun this study expecting to find limited use of paper-based freehand sketching by spatial design undergraduates for ideational purposes, I found all the respondents across the small sample evidenced having used a ‘core’ of seventeen sub-categories of ideational move, and two categories that do not contain sub-categories categories – see section 9.2.1 Which ideational motives were used by spatial design undergraduates and why did they use them? for details. This has caused me to focus more extensively on ensuring the students receive appropriate instruction on how to use paper-based freehand perspective sketches, plan sketches, section sketches, elevation sketches, diagrams, physical models, collages, photographs and the written word swiftly and fluently during ideation, and reflect on the outcomes doing so.

9.3.4.2 Encouraging students to use ideational moves not part of the ‘core’ of categories and sub-categories

Whilst identifying a ‘core’ of shared categories and sub-categories of ideational move, I also noted:

only the diagrams of respondents 01 and 05 contained the categories IT-D [49]: Uses real materials in response to a spatial design matter

respondent 05’s diagram alone contained the category IT-F [64]: Generates ideas in response to a spatial design matter by chance through an experiential, sensorial approach

only the diagrams of respondents 07 and 11 contained the sub-categories [12]: Produces and uses collage to investigate design ideas, [31]: Produces and uses paper-based freehand plan sketches in response to a spatial design matter, [40]: Produces and uses paper-based plan drawings, hand-drawn using a straight edge, in response to
In section 9.3.1 **Ideational moves**, I speculated that, in respondent 05’s sketchbook material, the categories *IT-D* [49]: *Uses real materials in response to a spatial design matter* and *IT-F* [64]: *Generates ideas in response to a spatial design matter by chance through an experiential, sensorial approach* both seemed to have been evidenced comparatively fleetingly, yet provoked unexpected creative outcomes. It has not been possible within this study to investigate this matter more extensively, however, I have regarded it as worthwhile to encourage my students to introduce to their design methodology moves that were not part of the ‘core’ of categories and sub-categories identified listed in section 9.2.1 **Which ideational motives were used by spatial design undergraduates and why did they use them?** and to reflect on the outcomes resulting from this.

**9.3.4.3 Encouraging students to create ‘room for chaos’ in their design ideation**

As was noted in section 9.3.1 **Ideational moves**, whilst being interviewed, respondent 08 said, ‘...the thing I love most about sketching on paper is that there is room for chaos.’ I was intrigued to hear this. Professional experience, informed by the literature review, had led me to believe that creative innovation was fuelled by the designer experiencing periods of uncertainty, confusion and frustration during ideation, and having encounters with the unexpected. The word ‘chaos’ seemed to encapsulate these characteristics. However, I found the sketchbook material examined across the sample contained no evidence of what might be regarded as periods of uncertainty, confusion and frustration during ideation, nor encounters with the unexpected, except in the work of respondent 05 which indicated a student who, on occasions, seemed not to know what she was doing, found her methodology confusing and frustrating, and was genuinely surprised by the design outcomes. All the other respondents appeared to have used the basic ‘core’ of sub-categories and categories to produce design
outcomes that, appeared more or less thoroughly considered and credible, but not innovative.
These findings have caused me to devise and introduce teaching and learning material that
seeks to create opportunities for students to experience uncertainty, confusion, frustration
and surprise during ideation, and to encourage reflection of these experiences and the
outcomes resulting from them.

9.3.4.4 Enhancing students’ ability to use categories and sub-
categories of ideational move connectedly
I identified marked contrasts in the connectedness of the ideational moves evidenced by
respondents across the sample, and observed that those whose work evidenced more
connectedness appeared to produce more thoroughly-considered work than those whose
work evidenced less. This has encouraged me to devise and introduce teaching and learning
material that seeks to foster a more connected approach to spatial design ideation, requiring
students to explore creative challenges using combinations of multiple ideational moves, and
to reflect individually and with their peers about the efficacy of this approach.

9.3.4.5 Difficulties of assessing sketchbook material
My study has revealed these difficulties to be threefold. Firstly, as an academic and external
examiner, I am aware it is claimed spatial design assessment focuses on design methodology
– we are not interested in nice-looking drawings of nice-looking buildings, but in a robust
process, so the sketchbook material is what matters, not the finished product. I have noted in
section 9.3.4.5 Research into sketchbook material that researchers appear to regard such
material, once shared with others, as having the candour of a secret diary, and therefore as
eligible for formative and summative assessment because it documents design process
authentically. My study, whilst it does not claim to be generalisable, has challenged these
positions.

Secondly, whilst analysing the ideational moves evidenced across the sample, I noted that no
respondent evidenced the same range of sub-categories within their sketchbook material.
This prompts the question, with such a wide range of ideational approaches, what criteria can be used to assess ideation in an academic context? For example, it is possible a student may use a comparatively narrow range of ideational moves (including few paper-based freehand sketches) but with brief but powerful employment of one in particular, to produce an imaginative scheme. To what extent should this approach be commended because it led to an impressive outcome, or criticised because it lacked variety? Equally, it is possible a student may use a comparatively wide range of ideational moves, including many paper-based freehand sketches used to create 'fuzzy stuff' (Goldschmidt, 1991, p. 131), to produce an unimaginative scheme. To what extent should this approach be criticised because it led to a disappointing outcome, or commended because it demonstrated variety? Ignoring the final design outcome during summative assessment of the sketchbook material seems ill-advised if its the purpose was to produce the final design. However, assessing the sketchbook material summatively within the context of the final outcome may to some extent be ‘black boxing’ it by presuming that, if the final outcome is successful, the methodology that led to it must de facto have been successful as well – in which case, why assess it at all?

Thirdly, this study brought to light issues concerning whether or not to have the student present during assessment. If s/he is absent, the sketchbook material would arguably be to a greater or lesser extent a black box: a cryptic collection of images and words which may or may not describe his/her creative process comprehensively. However, with the student present, assessing the sketchbook material is also problematic. I had thought at the commencement of my research that the respondents would have no wish to conceal any matter relating to their design ideation, although, since they might end up doing so inadvertently if they were not steered carefully by me, I regarded it as my job to make sure they said and showed as much as possible during the time available. On analysing the video-recordings it became apparent that I had under-estimated the performative nature of these interviews. As discussed in section 9.3.4.3 ANT and performance, the human participants in an interview are performing, and the sketchbook material is being performed. As discussed in section 9.3.4.6 Co-construction of assessed work within spatial design education, the performance of the sketchbook material is, in effect, a form of co-construction, perhaps
without the participants realising it.

How might the above points impact on my professional practice? They call into question the validity of using sketchbook material as evidence of design process for assessment purposes. They challenge the notion that heterogeneous sketchbook material can be assessed using standardised criteria. And they argue that sketchbook material should not be assessed formatively, or summatively, without the student present, but also that, when a student is present, his/her sketchbook material is performed, and the performance may be influenced by factors the academic does not understand fully. I propose no solution to these difficulties here, but remain mindful of them when assessing students’ work.

10. Limitations of the study

This study has drawn a number of conclusions about spatial design undergraduates’ approaches to ideation, and discussion by spatial design undergraduates of sketchbook material in an interview setting. However, it should be acknowledged that it has contained certain limitations:

1. The conclusions include that, contrary to my expectations and to what I found during the literature review, the respondents across the sample made considerable use of paper-based freehand sketching during ideation. It should be noted that, when prospective participants were briefed about this study, this may well, through a process of translation, have attracted undergraduates who had a preference for such approaches to spatial design development, and deterred those who did not, resulting in this claim simply being the tautologous statement that spatial design students who were enthusiastic about paper-based freehand sketching during ideation were enthusiastic about paper-based freehand sketching during ideation. That said, as has been stated, this study has sought to produce research outcomes that can contribute to discussions and debates about the teaching of spatial design ideational methods, not that can be generalised widely across the UK higher-education sector. I contend that
this conclusion does this, but the reader needs to bear in mind the respondents may well have self-selected.

2. The conclusions also include that the respondents evidenced considerable heterogeneity in their ideational approaches. It should be noted that each interview concerned a different project: respondent 01 discussed proposals for a three-dimensional product, respondent 07 a retail outlet, respondent 11 a museum, respondent 03 a gallery, respondent 13 a dwelling and respondent 05 an installation of uncertain function. It is unlikely each project had the same duration and each respondent had reached the same stage at the time of the interview, so it could be argued that heterogeneity across the sample was inevitable and reveals little of significance. That said, it has been my position throughout this study that spatial design students tackling spatial design project briefs could all be reasonably expected to use paper-based freehand sketches, digital drawings, physical models, photographs, secondary research, real materials and so on depending on the choices they made, the skills they possessed and the advice they received. Thus, if, for example, respondent 01 appeared not to have produced and used physical models, respondent 07 collages or respondent 11 real materials, I contend this was because of how they approached the project not because of limitations inherent in the project brief.

3. As was explained in chapter 4.0 Research methodology, I conducted a total of thirteen interviews across the pilot and main studies. All of these were video-recorded and transcribed; all the video-recordings and transcriptions were scrutinised during the content analysis and ‘evolved’ grounded theory phases; and the outcomes of this were represented in preliminary ‘timeline’ diagrams during the constructivist grounded theory phase (see Appendix M). Unfortunately, the considerable amount of time taken to produce the preliminary diagrams left, through a process of translation, insufficient time for me to produce final ‘timeline’ and ‘synoptic’ diagrams representing all thirteen interviews. Instead, I selected six for final diagramming and subsequent analysis. In chapter 4.0 Research methodology, I stated that the original sample was not
regarded as representative of the UK spatial design undergraduate community. It should be stated here that the six respondents selected were not seen as representative of the original sample. Rather, they were chosen because they provided access to data from all three academic levels and institutions. I have noted in chapter 8.0 **Analysis and findings** that seeking patterns in such a small sample was problematic: a larger sample might call into question the patterns proposed, suggest others or challenge the notion that there were patterns at all. It is thus proposed that, on completion of this thesis, diagramming and analysis of the data concerning the remaining seven respondents is carried out to test the conclusions I have drawn.

4. Four reasons had persuaded me to regard it as unlikely that the use of the camcorder led to distortion of the data: the respondents had been advised their identities were to be kept secret; only the respondents’ hands and arms were to be visible on the video-recording; I had considerable experience of putting respondents at their ease during focused interviews; and the event had what might be regarded as the characteristics of a typical tutorial during which the undergraduate talked about ideation work to a spatial design academic. On further reflection, I am aware the presence of the camcorder may have caused the participants to change – to translate – their behaviour during the interview. However, I note in response that video-recordings are a very popular means of data collection (Jewett, 2012; Heath et al, 2010), and their impact on data is frequently over-stressed (Heath et al, 2010).

5. As was mentioned in chapter 4.0 **Research methodology**, the diagrams are approximations. For example, in respondent 07’s diagram, a cluster of ideational moves is shown as the sub-category [6]: *Produces and uses paper-based freehand perspective sketches in response to a spatial design matter* overlapping with, to the upper right, [33]: *Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter* and, to the lower right, [4]: *Uses a word-based approach in response to a spatial design matter*. The person viewing the diagram may read these as indicating that data concerning [6]: *Produces and uses paper-based*
freehand perspective sketches in response to a spatial design matter occurred first in the sketchbook material, followed by [33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter and then [4]: Uses a word-based approach in response to a spatial design matter. This would not be a helpful way of reading it. The video-recording reveals that data concerning all three sub-categories were encountered on the same page and revealed simultaneously. It was not possible to ascertain the sequence in which the respondent carried out the various ideational moves, and I could not determine how to show graphically – and clearly – the simultaneous revelation of all the data. In another example, respondent 05’s diagram shows one allocation of the discursive move IM-W [38]: Evaluates his/her design process in an overview before two of [69]: Respondent points to a page or an item on a page without apparent encouragement from the interviewer and another of IM-W [38]: Evaluates his/her design process in an overview. The person viewing the diagram may read these as signifying that this respondent made a comment indicating a design evaluation, pointed twice to one or more items on the page, and then made another comment indicating a further design evaluation. This would not be a helpful way of reading the diagram. The video-recording reveals that the respondent was making design evaluations whilst pointing – these were parallel moves – but, as has been explained, I could not determine how to show that graphically and clearly. If the diagrams are approximations, how did I avoid misreading and then misinterpreting them? I argue here that the reflexive, iterative approach to the analysis reduced – and probably removed – this risk, but it is important to acknowledge in this relativist, qualitative study that such misreading may still have taken place.

6. The ‘timeline’ and ‘synoptic’ diagrams were an extremely helpful aid during this study, enabling me to abstract from the data and carry out comparative analysis across the sample. However, whilst all the diagrams were informed by the advice that ‘[g]raphics should tend to towards the horizontal, greater in length than in height’ (Tufte, 2001, p. 186) I found the length of several of the ‘timeline’ diagrams to be so great that it was difficult to accommodate them within this thesis, even with the page size set as
A3. This led to these diagrams being sub-divided and arranged over several lines, thus adding to the height. It should be stressed that I did not analyse the diagrams whilst they were presented in this manner, but it is acknowledged that understanding them may require extra effort on the part of the reader.

7. As was noted above, I acknowledge that the decision to evaluate the respondents’ ideational work in terms of how innovative the design ideas were is questionable. This study did not set out to carry out such an evaluation and the thesis contains no information on the criteria for doing so. That said, as the study has been carried out in submission for a Professional Doctorate of Education, its context has always been informed by my professional academic practice. As an academic who teaches and assesses design ideation methods, an architect who uses them, and an external examiner who moderates the assessment of design ideation work produced by students at other institutions, it is argued that I possess knowledge of the field and am thus qualified to offer opinions having made it clear that they are simply opinions.
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Institute for Research in Education (IREd)

Director of Studies: Professor Patrick Carmichael
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Appendix A – Research ethics documentation submitted for pilot study

This is included to evidence that the researcher carried out this study with full approval of the University of Bedfordshire’s Research Ethics Committee.

Ethics proposal

UNIVERSITY OF BEDFORDSHIRE

Research Title: Ethical issues (Annex to RA1 form)

Section A must be completed by the proposer and the form should then be submitted with a copy of the research proposal to the Director of the Research Institute.

Proposer: Gary Layden  Research Institute: IRED

Proposal short title: An investigation into the use of paper based freehand sketching by spatial design undergraduates

SECTION A – To be completed by the candidate

The candidate is required to summarize in the box below the ethical issues involved in the research proposal and how they will be addressed. In any proposal involving human participants the following should be provided:

- a clear explanation of how informed consent will be obtained;
- how confidentiality and anonymity will be maintained;
- how the nature of the research, its purpose and the means of dissemination of the outcomes be communicated to participants;
- how personal data will be stored and accessed;
- if participants are being placed under any form of stress (physical or mental) identify what steps are being taken to manage risks.

If problems are being used that have already received HEC ethical approval then please specify. Failure of any collaborating institutions should be clearly identified. Reference should be made to the appropriate professional body guide or practice.

Answer the following questions by marking either yes or no as appropriate:

1. Does the study involve vulnerable participants or those unable to give informed consent (e.g. children, people with learning disabilities, your own students)? Yes No
2. Will the study require permission of a guardian for access to participants (e.g. schools, voluntary groups, residential homes)? Yes No
3. Will it be necessary for participants to be involved without consent (e.g. covert observation in non-public places)? Yes No
4. Will the study involve sensitive topics (e.g. sexual activity, substance abuse)? Yes No
5. Will blood or tissue samples be taken from participants? Yes No
6. Will the research involve intrusive interventions (e.g. drug, hypnotic, physical exercise)? Yes No
7. Will financial or other inducements be offered to participants (except reasonable expenses)? Yes No
8. Will the research investigate any aspect of illegal activity?
   Yes No

9. Will participants be stressed beyond what is normal for them?
   Yes No

10. Will the study involve participants from the NHS (e.g. patients or staff)?
    Yes No

   If you have answered yes to any of the above questions or if you consider that there are other significant ethical issues that details should be included in your summary above, if you have answered yes to Question 1 then a clear justification for the importance of the research must be provided.

   *Please note if the answer to Question 10 is yes then the proposal should be submitted through NHS research ethics approval procedures to the appropriate COREC. The University Research Ethics Committee should be informed of the outcome.

1. Does the study involve vulnerable participants or those unable to give informed consent (e.g. children, people with learning disabilities, your own students)?
   Yes No

As part of my Pilot Study, I intend to carry out interviews, preferably audio taped, with certain of my students, certain of my colleagues’ students, and certain of my academic colleagues during 2013. As part of the Main Study, I intend to carry out semi-structured interviews, preferably audio taped, with certain student design students, and academics from certain other institutions during 2014. However, I would not regard these participants as ‘unable to give informed consent’, because my research protocol will include the following:

   a. Introducing my research project to these prospective interviewees clearly and openly, both verbally and in writing;
   b. Explaining to these prospective interviewees clearly and openly, both verbally and in writing, that either their participation or their non-participation (as applicable) would be without prejudice; that either their participation or their non-participation (as applicable) would be anonymous in research as I would store all interview data in password protected files; I would identify all audio tapes and transcripts using reference numbers that are stored separately in password protected files; I would destroy all interview data personally upon either my successful completion of the Professional Doctorate or my abandonment of the research programme having failed to complete successfully (i.e. no later than 2015), and I would not identify the source of any data in any public contexts, that all responses would be confidential to me because I am not aiming to critique the students, the course, the tutors, the design or the institution but simply to find out more about the field of enquiry — there are thus no ‘acceptable’ or ‘unacceptable’ answers to the questions;
   c. Explaining to these prospective interviewees that they will be able to withdraw from participating in this research programme, without prejudice, at any time up to the end of data collection;
   d. Explaining to these prospective interviewees that my published work concerning this research programme will not contain details of actual institutions investigated, so that institutions and/or its members would not be ‘put in a bad light’ by any data that third parties might regard as indicating performance or achievement deserving of criticism or concern.

I would regard ethical consent granted in response to the above to be informed and acceptable.

2. Will the study require permission of a gatekeeper for access to participants (e.g. schools, self-help groups, residential homes)?
   Yes No
As part of my MPhil Study, I intend during 2013-2014 to carry out some structured interviews, probably audio taped, with certain students and academics from certain other institutions. I intend to seek gatekeeper permission for these activities as follows:

a. Introducing my research project clearly, openly and in writing to the relevant representatives of these institutions’ research ethics committees.

b. Explaining clearly, openly and in writing to the relevant representatives of these institutions’ research ethics committees that either their participation or their non-participation (as applicable) would be without prejudice, that either their participation or their non-participation (as applicable) would be anonymous inasmuch as I would store all interview data in password protected files. I would identify all audio tapes and hard discs using reference numbers that are stored separately in password protected files. I would destroy all interview data personally upon either my successful completion of the Professional Doctorate or my abandonment of the research programme having failed to complete successfully (or no later than 2015), and I would not identify the source of any data in any public lectures, that all responses would be all interesting to me because I am not aiming to confuse the students, the course, the lecturer, the department/Institution, or the Institution but simply to find out more about the field of enquiry. These are thus no ‘acceptable’ or ‘unacceptable’ answers to the questions.

c. Explaining to the relevant representatives of these institutions’ research ethics committees that their students and/or academics will be able to withdraw from participating in this research programme, without prejudice, at any time up to the end of data collection.

d. Explaining to the relevant representatives of these institutions’ research ethics committees that any published work concerning this research programme will not reveal details of actual institutions investigated, so the institution and/or its members would not be ‘put in a bad light’ by any data that third parties might regard as indicating performance or achievement deserving of criticism or concern.

Checklist of documents which should be included:

- Project proposal (with details of methodology & source of funding)
- Documentation seeking informed consent (if appropriate)
- Information sheet for participants (if appropriate)
- Questionnaire (if appropriate)

Signature of proposer: [Signature]

Date: 07/12/2013

This form together with a copy of the proposal should now be submitted to your Research Institute Director.
Project Proposal with details of methodology

An investigation into the use of paper-based freehand sketching by spatial design undergraduates

Garry Layden
23/11/12

Many spatial designers appear to agree that it is important – perhaps even essential – to use paper-based freehand sketches during the preliminary stages of a typical project in order to explore the design challenges and investigate possible solutions innovatively, fluently and thoroughly. However, evidence indicates that many UK spatial design undergraduates are not producing such sketches during these stages – or indeed during any project stage – and that this will lead to a decline in the quality of the finished work.

Little appears to have been written about this apparent decline, including what might be the reasons for it, what methodological tools might be being used instead, and what remedies, if any, should be introduced. The project seeks to investigate:

1. The use of paper-based freehand sketches as a design development tool during the preliminary stages of a typical project
2. The wider spatial design development process, including the use of Computer Aided Design and physical sketch model-making as design development tools during the preliminary stages of a typical project

The project seeks to do this in several ways. Firstly, it seeks to invite selected spatial design undergraduates, in one-to-one interviews with me, to think about as they take me through their sketches page by page, explaining what they did, what they were trying to do, why they chose these approaches, how effective (or otherwise) the approaches were, what they would do differently next time, and so on. Secondly, it seeks to invite selected spatial design academics, in one-to-one interviews with me, to reveal and discuss their thoughts on the use of paper-based freehand sketches and the wider spatial design development process, including the use of Computer Aided Design and physical sketch model-making as design development tools during the preliminary stages of a typical project.

It is intended that the spatial design undergraduates and academics will come from a range of academic and professional backgrounds: a widening participation university, a more established university, a polytechnic that accepts students with higher entry trends, and a high-ranking design institution. My preference will be to interview two to three students each from Levels 4, 5 and 6 at each institution, plus two to three academics at each institution. If more than two to three students express willingness to participate, I would propose to select the student respondents at random from this larger number.

This project is being funded by the University of Bedfordshire.
Interview questions:

The interviews will include questions that explore the following:

Interviews with students:
- The students' pre-university education and training in paper-based freehand drawing, how they rate and value their skills, and what they think about producing such drawings.
- What the students understand about the generation techniques during the early stages of a type of design project, the role of paper-based freehand drawing and other methodologies within these stages, whether the students value these various methodologies and why?
- The amount of time the students spend practicing paper-based freehand drawing, and other methodologies, why they choose to practice for this long and how they regard this time allocation.
- How the students regard the preference of spatial design, and how the use illustrates adapting to academic and progressing along their chosen career paths.

Interviews with academics:
- The academics' expectations of the students' pre-university education and training in paper-based freehand drawing, how they rate and value their students' skills.
- The reasoning of paper-based freehand drawing hidden in the process, who teaches it, what is the learning experience, how do they teach it and for how long?
- What the academics learn about the generation techniques during the early stages of a type of design project, the role of paper-based freehand drawing and other methodologies within these stages, how the academics value these various methodologies and why?
- The amount of time the academics expect the students to spend practicing paper-based freehand drawing, and their reasons for this expectation.

How the academics regard the preference of spatial design, and how the use illustrates adapting to academic and progressing along their chosen career paths.

Documentation seeking informed consent

See Ethic proposal above.

Information sheet for participants

I wish to inform you that:

- Both your participation and your non-participation in this project would be without prejudice.
- Your participation and your non-participation in this project would be anonymous research as I would store all interview data in password-protected files, I would identify all educators and researchers using reference numbers that are stored separately in password-protected files. I would destroy all interview data personally upon either my separation or completion of the program within 10 years of the research program being initiated to complete successfully, and I would not identify the source of any data in any public histories.
- All your responses will be of interest to me because of the nature and nature of the field of inquiry - there are no unacceptable or unanswerable answers to the questions.
- You will be able to withdraw from this research program, without prejudice, at any time up to the end of data collection.

My published work concerning this research program will not reveal details of actual institutions involved, as the institution and/or its members would not be "in a bad light" by any data that has passed through indicating reasonable or appropriate answers of concerns or issues.
Appendix B – Transcript of video-recording of respondent 07’s interview (produced by the researcher)

This is included to illustrate how the researcher documented the following in written form: verbal and non-verbal interactions between the respondent, the researcher and the sketchbook material; and the content of the sketchbook material.

Respondent 07 Transcript 36.27 Duration

11/02/14

Transcribing commenced Tuesday 14/02/14 and completed Friday 28/03/14

Starts at: 00.00.00

[Respondent 07 was a Level 4 (Year 1) Architecture student at a high-ranking college of design. He brought to the interview a number of Level 4 sketchbooks and loose sheets of preliminary work mostly concerning one project, the Retail Space.]

Start of the ‘Retail Space Project’

[07 begins by opening a small (A4) lined notebook to reveal 1 page of small, diagrammatic (ie: thumbnail) exploratory paper-based freehand sketches – a perspective/isometric, and 11-12 sketches showing variations of a staggered, almost herringbone pattern of lines (maybe plans, maybe elevations, maybe the respondent is not sure yet) – plus 1 page of hand-written text including “Eisenman quotes that it is ‘Right to conquer pure function…’”, “…for example, a typical/conventional wall would be used to block a way…”, “…referring back to a deconstructivist style I have implemented the idea of depicting a wall wrongly…” and “…inspired by tree branches…”]

07 “For my…design proposal…mine was…the Retail Space. The reason why I chose that because I wanted to…do a design that involves everyone from this University…So for the early stages I did quick sketches [07 points to the thumbnail sketches mentioned above then turns back 2 pages to reveal 2 pages of more detailed paper-based freehand sketches showing possible spatial interventions. Some of these are very small – 5-6 thumbnail diagrams that I cannot understand; most are perspective views initially showing people seated on furniture and what may be retail display units, then 1 perspective view of a three-legged structural system, then 2 perspective views showing quite a sophisticated display system (including the word “Rotate”), then 2 perspective views showing a proposed structure interacting with the existing structure; the annotation includes phrases such as: “Seating area”, “Pillars/Beams”, “Materials?? concrete/steel/wood…” and “Peter Eisenman”…These were my early sketches, these were just…quick ideas of how I can…implement this into my design.”

GL “Did you have a site…?”

07 “...My site was at the seventh floor...in this building...These were my...early designs...[07 turns a page to reveal 1 larger paper-based freehand perspective sketch showing a possible façade treatment, with shading and images of people, plus hand annotation: “Colour Scheme: Black and White”, “Glass? Frosted? Acrylic? Coloured?”, “Wood?! Varnished? Glossed...?” and “Tree branch Inspired!”; followed by 1 paper-based freehand plan sketch showing the
pattern of structural elements in some detail, plus hand-annotation “Counter”, “Fashion/Product Design/Architecture/Media”, and “Using MDF/Easily Manufactured/Cost Efficient…”].

GL “Is this like day one of the project?”

07 “…Yeah, these were part of the project…Our area was pretty small so I had to make sure…It would fit the vicinity…so therefore I thought of…Making it into a rectangular shape, and for these ones here [07 points to the perspective view mentioned above, and then turns the sketchbook so that GL can see the page better] these are just basically…the façade. I base my…design on Peter Eisenman.”

GL “…I noticed…he was mentioned…on the previous page…[GL turns back to the two pages of slightly more detailed paper-based freehand sketches mentioned above] So, is this your first page of sketches here?”

07 “These were some of my first pages…[07 turns back some pages to reveal paper-based survey drawings produced quite sketchily but using straight-edges in the main: paper-based freehand section/wall elevation sketches with dimensions added by hand. These include: 6 sectional elevation drawings including hand-written dimensions and dimension lines, plus 1 rather mysterious diagram. There is also 1 word of hand-written text: “Total =” before some simple calculus].

GL “…So you surveyed the space, and now you’re in and you’re working in perspective?”

[07 has turned pages in his A4 sketchbook to reveal 2 large paper-based freehand perspective views. The first of these is a black-and-white pen sketch of the ‘outside’ of the intervention, including people and the hand-written words “STRUCTURE: FRAME”, “They use a skeleton” and “Entrance” (the last of these linked by arrows to two places on the perspective), plus a thumbnail paper-based freehand diagrammatic plan sketch; the second is a hand-coloured sketch showing people standing in front of display units and casting shadows across the floor, plus the hand-written words “Lights up/Illuminates the room/appealing at night time”.]

07 “Yeah…The reason why I chose Peter Eisenman, because, I really like his idea of…natural architecture…He says that everyone uses…technology way too much and…it doesn’t have that classical concept of architecture and it goes away from…using…paper…and…”

[07 has turned away to leaf through a pile of larger (A2) sheets.]

GL “Right, survey drawings coming up…”

[07 moves his sketchbook to one side and reveals, in fact, 1 isometric drawing showing his site. This drawing was produced using straight edges. The drawing is very clean and carefully drawn.]

07 “…This is an axonometric of my space.”

GL “…Right, hand-drawn…with straight edges…”

07 “…Another one [07 reveals 1 large-scale (perhaps 1:20 or 1:10) wall elevation drawing showing his site which shows door handles, hinges, locks on lockers. This drawing is very clean and carefully drawn].”

GL “And…were you asked to produce this family of…orthographic and isometric drawings…?”

07 “Yeah, we were asked to do this just to…basically improve our skill in surveying…drawing…on paper…and just to practice our perspectives, our lines [07 reveals 1
GL "...So this is...helping you to understand the existing...context...for this...?"

07 "...Yes..."

[07 turns away to search for more drawings on the floor, and mentions “AutoCad” while doing so.]

GL “You went onto AutoCad soon after...producing these exploded drawings?”

07 “...No...I was still doing my...”

[07 turns away to search again and asks GL if he would like him to show his other drafts. GL affirms.]

07 “So...after surveying the area, we had to do our measurements, and this...was my first...design concept...” [07 tables 1 wall elevation/section drawing produced by hand using straight-edges: quite a neat, carefully-produced drawing showing a complex system of structural members.]

07 “...I don’t know what was the...building called but it was by Peter Eisenman, and it was of a kitchen...and...the area consists of...beams like trees coming down...and I was inspired by that.”

GL “So how did you get...from those sketches in that small booklet there...to being able to draw this plan we’re now looking at...providing a better view of the wall elevation/section drawing produced by hand using straight-edges, although GL calls it a plan?”

[07 explains that the drawing “basically” shows the façade.]

07 “Cos what I wanted to do with my first idea [07 removes his A4 sketchbook from view, then turns to the page in it that contains an early freehand perspective sketch, already tabled, showing a human figure standing in a rotatable drum-like structure, complete with shading, then brings it back into view] was this circular thing going [07 moves the A4 sketchbook to one side and then points to a circular feature on the wall elevation/section drawing]...where people could just walk in and grab books...which was supposed to be...retail.”

[07 turns away to find more drawings on the floor.]

07 “And my second idea was [07 spends some time off camera leafing though sheets of paper]...this [07 tables a large scale (1:20, I think) dimensioned floor plan including dimension lines, hand-drawn with straight-edges, showing the external envelope and structure, plus an ‘island’ intervention]...which I developed by reading through...one of his [Peter Eisenman’s] books.”
[After a somewhat lengthy pause as he went off camera, and without being asked, 07 tables his laptop on which can be seen 2 digital plans, 1 digital section and 1 digital isometric view of the 'island' intervention being discussed. GL asks 07 to discuss this work.]

07 “…With the second idea, when I was reading through…his [ie: Peter Eisenman’s] work…he said that he had a lot of semiotics and symbols and meanings into his design…and in a way I kind of want to…implement that through the use of spaces. [07 takes his laptop away and begins to discuss the plan already tabled]…With this idea, I basically wanted to give the idea of…’cos it’s very…compact [07 gestures with both hands to the drawing], so I wanted to give the idea of education becoming really difficult obstacles…and you have to…go around and about…to find what you’re looking for. [07 points to the ‘island’ intervention]…I haven’t really designed it yet but…in this area here…it’s very complicated to get up to…there’s only one person that can go in here…and…as I got that, that’s when I had my final…design…”

[07 turns away to look for more drawings, and tables 1 neat, professional-looking plan drawing, probable scale 1:10, on tracing paper showing a different proposed layout, hand-drawn with straight-edges. He then removes that to show another drawing of a similar-looking scheme on opaque paper.]

07 “…So basically…I wanted to…go about the idea of education becoming a very…having a lot of obstacles…so…what I did was I separated…the retail side into four spaces [07 points to the four spaces on the plan]…this is basically like the fashion section, the architecture section, graphic design and that could be like something else…What I wanted to imply was that…in University people are so close together…but they don’t really communicate with each other because they’re so into their own course…That’s why [07 points with two hands to the four spaces on the plan, then points to the partitions] they’re so close to each other but yet these are walls that separate them…And this is just a section that I did…”

[07 tables 1 section, hand-drawn using straight-edges, showing dimensions, dimension lines and a cut-out human figure.]

GL “…Showing in section that design we’ve been looking at here?”

07 “Yeah…[after a somewhat lengthy pause 07 tables 1 sheet of tracing paper showing hand-drawn coloured lines (red) over the floor plan already tabled] This is just the circulation, I’m having a go at that…And after that I move onto…the axonometric.”

[07 tables 1 neat, carefully produced axonometric drawing, hand-drawn using straight-edges.]

GL “Okay. At this point, are you still designing or are you now explaining what the finished…scheme looks like?”

07 “…Yeah…basically…this is…the final concept…”

At 10.12

07 “…of my design…”

GL ”It’s very Peter Eisenman, isn’t it?”

07 [Laughing.] “Yeah. And I just showed it through…different…perspectives…axonometric. And soon after that, I did it on a CAD model.”

[07 spends quite some time looking for evidence of the CAD model, finally bringing his laptop into view. The image shown is 1 digital plan of the design intervention in situ.]

GL “…This is AutoCad?”
“Yeah…This is just a plan view…[07 rotates the view to produce an isometric showing, in grey and white tones, floor and wall planes and structure] And this is what it actually looks like…” [07 begins zooming in on this isometric drawing.]

GL “…How long did it take you from these early sketches to get to here?”

07 “…It would take about…five weeks.”

GL “Okay…We’ve got a complete package here from freehand sketches through to plan drawing through to sections, isometric, then we’re producing digital images in plan and in…isometric again…Quite a lot of what you’re showing here is two dimensional work and that’s not a criticism…Were you designing by then in two dimensions because you could see it in your head as a three-dimensional thing – how did it work for you?”

07 “What d’you mean by that?”

GL “…What I mean is …if we look at your sketchbook…[At GL’s request, the laptop is put to one side revealing the isometric discussed above, and there is some searching through drawings previously discussed, focusing on a page in the larger (A3, perhaps) sketchbook not seen before during this interview, which 07 tables showing three-dimensional (isometric rather than perspective) paper-based freehand sketches of partitions and structural elements, hand coloured, and very little hand-writing (“Wall Structure Ideas”, “Geometrics”, “Square/Rectangles”) plus 1 paper-based freehand sketch diagram, content unclear] Yes, that’s actually what I mean. [Another sketchbook (the smaller one discussed at the start of this interview) is tabled showing sketches seen before during this interview: preliminary paper-based freehand sketches including the ‘drum-like’ structure with a human figure shown within it] Have you got more examples of…sketch development that led you to these…plan ideas that you showed?”

07 “…[07 points to the sketchbook material described above, turning pages in both sketches with both hands] So again these were the…early stages…[07 turns a page in the smaller sketchbook to return to a paper-based freehand perspective sketch showing a possible façade treatment, with shading and images of people, plus hand annotation, plus a paper-based freehand plan sketch showing the pattern of structural elements in some detail, plus hand-annotation (discussed and sub-categorised above, near the start of this interview). He also turns a page in the larger sketchbook to reveal 4 paper-based freehand perspective sketches of façade treatments, one colour-rendered, plus 4-5 paper-based freehand elevation sketches of façade treatments, and one hand-written word: “MDF]…from getting the…façade and…trying to make it look very Peter Eisenman….”

GL “And what’s the function of the two different sized sketchbooks? Is that portability?”

07 “…Yeah…[07 flicks through the smaller sketchbook] this one’s just like really quick sketches whereas this [07 turns a page in the larger sketchbook to reveal further paper-based freehand sketches, all perspective/isometric views, one colour-rendered, with some handwritten text. These comprise 2 paper-based freehand sketches showing structural elements in isometric/perspective, almost as wire-frame images, plus at least 4 paper-based freehand sketch diagrams showing constructional and dimensional information, plus hand-written text including: “Type of glass”, “interlayer – laminated”, “LED (light emitting diode)” and “PILLAR MEASUREMENTS”. Next to this is 1 paper-based freehand sketch elevation, very rudimentary. From the smaller sketchbook, 07 has revealed, again, the hand-coloured sketch showing people standing in front of display units and casting shadows across the floor, plus the text “Lights up/Illuminates the room/appealing at night time”) is for my actual idea…[07 flicks through the larger sketchbook to a page showing 4 paper-based isometric/perspective sketches, and 7 paper-based freehand sketch diagrams accompanied by handwritten text (“side (elevation)”, “most commonly used”, “glass blocks”, “MDF Boards Thickness – 25mm”, “different positions!”), “Aerical” [sic], “Timber Structure”, “circulation side” and (in connection with numbers) “MM”) plus 2 paper-based freehand sketch elevations (one very rudimentary, one hand-dimensioned with dimension lines)] [07 removes the smaller sketchbook from view] like, the measurements and everything.” [Unbidden, 07 takes away the smaller sketchbook]
containing the paper-based freehand perspective sketches showing possible façade treatments.

GL “…So here we see…[GL points to the paper-based freehand sketches showing structural elements in isometric/perspective, almost as wire-frame images, in the larger sketchbook] working in three dimensions…beginning to explore a volume…a structural system, or a spatial division…and now we’re looking at number here, we’re looking at proportion and size…” [Unbidden, 07 moves the sketchbook to provide a better view of the sketch elevation.]

[07 turns a page in his larger sketchbook, passing en route over 3 rudimentary paper-based freehand perspective sketches (not discussed) to reveal 1 page containing quite a lot of hand-written text (including “Final Design”, “Materiality”, “Glass Blocks”, “most common used is…”, “Timber” and more hand-written text concerning materials and construction); followed by 1 page of paper-based freehand sketches: 5 paper-based plan diagrams of different sizes plus hand-written text (“Main Area”, “Retail Store”, “– Counter and Shelves”, “ – Playing with structure”, “breaking Conventional Methods” and more I cannot read; some of this text is circled by hand); plus 1 paper-based freehand ‘wire frame’ perspective (all not discussed.).]

[07 repositions his sketchbook to show the 1 paper-based freehand ‘wire frame’ perspective quite clearly.]

[07 seems to be leafing through something off camera.]

GL “So you’re using text to explain to others and maybe to yourself the ideas, the meaning behind this?”

07 “Yeah.”

GL “So, we’ve got layout…I’d be interested to see how that compares with the plan drawing, I think it’s quite similar isn’t it?” [07 removes the sketchbook being discussed.]

07 “Mmmhm.”

[Once the sketchbook is taken away, it reveals the isometric drawing produced with straight-edges, discussed above, then the plan drawing on tracing paper produced with straight-edges, discussed above, then the plan drawing hand-drawn with straight edges, seen previously. Then 07 brings the sketchbook showing the plan view mentioned above back.]

GL “So we look at that, yes it actually is quite similar…There are some adjustments but the layout is quite clear here already [GL points to the earlier sketch plan and to the plan drawing hand-drawn with straight edges, seen previously].…And you had some perspectives here, do they follow-on from…from the sketch views?”

[07 brings into view a sheet (A2) showing a print of various CAD drawings: 1 floor plan, 2 plan perspectives, 4 isometrics (one larger than the other 3, 1 a wire-frame view, the other 3 solid). Then he looks for and, after a little while, tables a print of 1 digital exploded isometric drawing of the design proposals in situ.]
07 “…Diagram of the area.”

[Then he shows prints of 2 digital plan drawings.]

07 “…Also I did quite a few perspectives, hand rendering.”

[07 tables 1 perspective view of the outside of the proposed retail unit, hand-drawn with straight-edges and watercolour rendered, including 1 faintly-drawn human figure.]

07 “This was…[07 points to the perspective visible] the second idea. But this…is the third one

[07 tables another perspective view, hand-drawn with straight-edges and watercolour rendered, including 2 corrugated cardboard human figures sellotaped to the drawing].”

GL “…Why did you produce these drawings, these particular drawings?”

07 “…To visualize…how it would look like…’Cos I wanted to…do it by hand before doing it in CAD…’Cos I kind of wanted to get that sense of…purity, rather than doing it on CAD…Whereas this is more natural…than digital format.”

GL “Okay.”

07 “It just…gives a sense of creativity.”

GL “Could you see this in your head already? In other words, are you explaining it here to others maybe or are you actually as you’re drawing it you’re finding out new things about it?”

07 “I think, more like finding out new things about it…”

GL “[GL returns to the first perspective view, hand-drawn with straight-edges and watercolour rendered] So you took that previous idea quite far before deciding it wasn’t right for you.”

[GL refers to the first perspective view, hand-drawn with straight-edges and watercolour rendered.]

GL “…Did this drawing, for example, demonstrate to you that this idea wasn’t working? Did it…help you decide that there’s something better out there?”

07 “Well, it’s more like I wanted to focus my design on Peter Eisenman…rather than just designing a retail space for the sake of it ‘cos I want to go about through these…messages and semiotics…designing this for people ‘round the University.”

GL “And the Peter Eisenman part of this, did you do research into Peter Eisenman…?”

07 “Yeah…synopsis…”

[07 looks for evidence of his research into Peter Eisenman and GL chats to him about this. 07 then asks if he should “read some” and GL says, “Please do.”]

07 ‘Well he says that…[07 mentions Eisenman’s discussion of ‘anthropocentric’ and ‘technocentric’ architecture at some length, reading extensively from his notes]…so I just…wanted to…use that idea of…not using…CAD all the time…to produce my…designs [07 moves some of his tabled drawings to reveal CAD work already discussed]. I want to kind of have that sense of free flow…design with symbols and meanings [07 reads more from his notes on Eisenman]…”

GL “So was it unusual that you were producing these hand-drawn images, was it unusual here, were your other students more inclined to work on computers? Or were you all doing this?”
07 "...I think it was...normal to do...on paper...you wouldn't go about doing it on CAD straight away...you would first do it on a piece of paper...to get your ideas across, getting...the measurements..."

GL "And your approach here...if I may summarise...you showed the small sketchbook first, and you showed some early ideas and an...interest in Peter Eisenman, then there's the larger sketchbook with other drawings coming through, we can see them there, and then you're moving to...straight-edge drawing, plans, sections, isometrics, and then you're moving to some computer-aided design work...that process of moving from one kind of approach to another, was that your idea or were you guided...?"

07 "...I was guided...So we would learn more about...the technology and CAD, and how they work...'cos now a lot of people use...CAD and...V-Ray...to make a concept seem more realistic...and real-life."

GL "And what do you think of that?"

07 "...I think it's...a perfect thing...to do so...you can visualize it clearly and you can see it very well, and it just...gives more satisfaction rather than having a piece of paper."

GL "...When you say, 'Have it on a piece of paper', do you mean as compared to having it digitally on a screen, is that what you mean, or when you say 'Have it on a piece of paper' you mean draw it on paper? I'm not quite following you here...[07 asks for clarification] When you were talking about people...using CAD to produce concept drawings that look more real, they would print those out wouldn't they? But it's a digital image rather than a hand-drawn image. I think that's what you're saying...So you were guided...in what to do and when to do this...Were you told, don't use a computer to begin with, don't work on CAD to begin with...?"

07 "...Yeah...they told us to...do it on A2 paper first."

GL "A2 paper first to produce these kinds of drawings that you see here, is that right?"

07 "Yeah...And then we had...lectures with our...tutors on just...basic uses of CAD...just making like squares and circles..."

GL "...Gradually developing your knowledge and your skills."

GL "Could you please bring those two sketchbooks back here...onto screen...?"

[07 does as requested, revealing, firstly, the larger one, showing 2 paper-based freehand perspectives (one smaller, one larger, the latter including a ghostly image of a human figure) plus 2 paper-based freehand plans (one smaller, one larger), plus and quite a lot of hand-written text.]

GL "So if we start with this one here [GL is pointing to a page of paper-based freehand sketches in 07's smaller sketchbook, not seen before during this interview, showing 3 perspective/isometric-type paper-based freehand sketches plus 13 or so paper-based freehand sketch diagrams (7 elevational, 1 an isometric and the rest more difficult to determine), plus hand-written text ("south", "north", "counter ideas", "Retail Experience", "Make it Interactive!", and "Kiosk"), all exploring ideas for his design intervention]...Do you discuss these drawings with your tutor?"

07 "...[GL turns a page in 07's smaller sketchbook to reveal 1 fairly large, vigorously drawn paper-based freehand sketch diagram (maybe a section) plus 5 paper-based freehand sketch diagrams (one of which is verging on being not a diagram but an isometric sketch, but does not quite make it in my opinion because it lacks a sense of reasonably accurate proportion. There is also hand-written text: "larger Box!", "Windows", "Entrance" and "How will it be communicated? Materiality? [unreadable]?"") Not necessarily, no...This is just more like a guide thing, and how I go about doing...my design. [GL is leafing through the smaller sketchbook showing two pages of hand-written text including "Glued Laminated Beams" and...}
“Structural Solid Wood”, followed by another page of hand-written text including “Construction Considerations for Public Spaces”, followed by two more pages of hand-written text including “Quality and Tidiness”]

GL “Ah, interesting way of…describing it. Quite a lot of writing…as well. [GL is continuing to leaf through the smaller sketchbook, moving quickly past 2 pages of hand-written text (not discussed but seeming to me to not concern this project), 1 page of hand-written numbers (purpose not clear to me, but the numbers appear to be conversions from one scale to another) and hand-written text (“Measurements for Des Prog” plus “Wood Thickness”), followed by 2 more pages of hand-written numbers (also appearing to be conversions from one scale to another)] Is that still concerning this same project or…”

07 “…Some of it, yes…but mostly from other lectures…” [GL has reached a page containing 3 or so paper-based freehand sketch diagrams showing isometric/perspective views of part of a glazed partitioning system, 1 with a hand-written dimension, plus hand-written text: “Black”, “White”, “Yellow” “Red”, “Blue”, plus what appear to be to be 4 paper-based freehand sketch diagrams showing storage/display possibilities, plus text: “Art”, “Architecture”, “Fashion/Product” and “Books.”]

GL “…So you have this with you…at all times, do you, in case you get an idea?”

07 “Yeah.”

GL [Referring to the sheet of paper-based freehand sketch diagrams showing 3 or so small isometric/perspective-type views exploring 07’s design proposals] Now this looks like we’re returning to this project…“

07 “…[Referring to a subsequent page of hand-written numbers that GL has just revealed] They’re just like the measurements.”

GL “…Right, [flicking backwards quickly through the smaller sketchbook] so we’ve got material here that’s a combination of sections, three-dimensional work, quite small, [GL points to the page already tabled above, showing 3 isometric-type paper-based freehand sketches plus 13 or so paper-based freehand sketch diagrams (7 elevational, 1 an isometric and the rest more difficult to determine), plus hand-written text (“east”, “west”, “south”, “north”, “counter ideas”, “Retail Experience”, “Make it Interactive!!” and “Kiosk”), all seeming to explore ideas for this design intervention] what are you doing here…[GL points to several of the elevational diagrams one-by-one]?”

07 “Oh, this is just…different facades from…different directions…It’s like the east, the west…the south and the north [07 is pointing to four diagrams one at a time here. Each is labeled “East”, “West”, “North” and “South”]. ‘Cos I kind of wanted to…have that sense of…pattern…along my façade, so these are just like demonstrating that…”

GL “Alright. And let me see…what’s in here [GL has put the smaller sketchbook to one side and is looking in the larger sketchbook].

**Interruption to the ‘Retail Space Project’**

GL “So, that’s it? There’s more…?”

[GL reveals a page showing a paper-based observational perspective sketch, produced using straight edges, but these appear to be not relevant to my research.]

07 “This is…just different project…It was just like practising sketching…perspectives…I have more at the back.”

GL “When you came here…did you enjoy sketching before you came here?”
[07 reveals a paper-based observational perspective drawing produced using straight-edges, plus a paper-based observational perspective freehand sketch. Both are line drawings.]

07 “…Yeah ‘cos I did Fine Art for my…A-levels…So I kinda enjoyed it…get back into it…”’Cos we didn’t really…do perspectives during A-levels, so it was kinda interesting for me to do.”

**Resumption of the ‘Retail Space Project’**

GL “…And to begin with, what guidance do you get on the design process? You start with nothing, what do you do first, what do you do next, what kind of guidance do you get on that?”

07 “Well, they just like tell us…to use specific tools and how, if you have a T-square you do this and that…and it’s just kinda like basic tutorials…which leads us to making these sketches [07 points to a paper-based observational perspective drawing produced using straight-edges]…survey drawings and whatnot.”

GL “And how well do you think this project went, the…Retail Project? Was it a success, do you feel? Are you happy with it?”

07 “…To an extent…but I didn’t really fully…complete the project…No, I did, but I didn’t finish…the model of it…”’Cos we didn’t have enough time.”

GL “This is a digital model of it…?”

07 “Yeah…I think I have the…model on my computer…”

** Interruption to the ‘Retail Space Project’**

[While 07 is looking for that digital model GL is leafing through 07’s larger sketchbook, revealing more paper-based observational perspective drawings produced using straight-edges, plus some paper-based observational perspective freehand sketches, none of which appear to be related to the Retail Design project. 07 begins to talk about the Oxo Tower project, which is not relevant here. He then puts the smaller sketchbook to one side to reveal a paper-based freehand section drawing in the larger sketchbook which seems not to relate to the Retail Design Project.]

**Resumption of the ‘Retail Space Project’**

GL “[Perhaps feeling impatient because 07 has not found the image/s of the digital model] So I’ve been doing research because I suspect that students are not drawing by hand as much as they used to. I get the impression that you do draw by hand.”

07 “Yes, most of us, yes.”

GL “…Most of you? Which is really what I hoped I’d find. You enjoy it?”

07 “…I enjoy, yeah.”

GL “D’you find it helpful?”

07 “…I think it’s helpful because you wouldn’t go straight into using CAD if you don’t know the measurements and what it actually looks like…It’s better to do it here than on CAD, so you have the accurate measurements on your paper.” [The smaller sketchbook is back on screen, placed there by GL. The page on screen is the one containing 3 or so paper-based freehand sketch diagrams showing isometric/perspective fairly detailed views of part of a glazed partitioning system, 1 with a hand-written dimension, plus hand-written text, plus what appear to be 4 paper-based freehand sketch diagrams showing storage/display possibilities, plus text. It is not discussed.]
GL “So the CAD for you is about presenting…?”
07 “Presenting, yes.”
GL “…what you have already designed?”
07 “Mmm [GL takes this as an affirmative response].”
GL “Not about designing?”
07 “No.”

[GL is leafing backwards through the smaller sketchbook, and reveals 1 paper-based freehand sketch plan diagram showing the general layout of the Retail Space as an arrangement of boxy zones, plus hand-written text: “Counter”, “Books/Library”, “Fashion”, “Architecture/Interior”, “Product and Interaction Design” and “Level 7 (702)” (all marked on the plan diagram) plus, written separately, “Architecture/Interior”, “Fashion” and “Product and Interaction Design”; plus lists of items that can be sold in the various parts of this Retail Space, including: “Pencils/Pens”, “T-Square”, “Art Materials” and “Needles”. This is not discussed during the interview. GL goes back further to pages already discussed, then forward again, then backward again. What is he looking for? 07 is silent all this time.]

GL “We have a Peter Eisenman quote here…and then some very basic little sketches there…beginning to open up possibilities…” [These sketches, and the quote, have already been seen during this interview.]

[07 interrupts to show his online ‘blog’, visible on his laptop screen. The first page is a title page mostly showing photographs. The next page shows photographs of the area local to the University, plus something called the “Out of your Box” project. Both are accompanied by word-processed text. The “Out of your Box” project appears to be what I am calling the Retail Space project.]

GL “…This is your blog…?”
07 “…This basically documents everything that we've done.”
GL “…You sure you want me to see this, it does have your name on it…that's for your choice…”
07 [Laughing] It's alright…[07 clicks “Enter” and opens the “Out of your Box” project].
GL “So how do you use the blog here then? Is it…scans and photographs of sketches and commenting on…”
07 “…Yeah, pretty much…It’s just like the documentation of our work.” [07 is showing numerous photographs of the site, plus word-processed text.]
GL “…That's the space.”
07 “[07’s blog now shows copies of two paper-based plan drawings, hand-drawn with straight edges (seen earlier, or very similar to those drawings seen earlier)] The survey drawings that I did.”
GL “And I was aware, no photographs in your sketchbooks. But you have them in your blog.”
07 “[07 is scrolling horizontally through his blog revealing observational perspective drawings (hand-drawn with straight edges) of his retail project site (seen earlier, or very similar to those drawings seen earlier)] Yeah…This is the Peter Eisenman research…”
GL “…Text concerning his work.”
"...The synopsis... The design stage has scrolled forward to reveal an array of paper-based freehand sketches (plan views and perspective/isometric views) already showcased and discussed above..."

[07 is moving quite quickly through this blog, not stopping to describe or discuss any post in detail but rather mentioning very generally some of the contents.]

GL "...Were you all asked to choose an architect or a designer to inspire your work?"

07 "...They gave us the...architect..."

GL "...Now I think most of those drawings we have seen is now showing the paper-based freehand sketch showing circulation routes through his retail project design proposals..."

07 "That's...the CAD drawings again, and the CAD renders with...scale is now showing perspective views of his CAD model."

GL "And will you now finish your...model in your own time...?"

07 "...Yeah...And this is...the unfinished model 7's blog shows a number of photographs of a corrugated cardboard and mountboard model including a cut-out human figure]."

GL "Yes...as a presentation model or as a design development?"

07 "...As a presentation, basically..."

GL "You didn't use...physical model-making to develop your ideas?"

07 "No this is the physical model here."

GL "But you didn't use it...in order to...try things out or..."

07 "Oh, no no no, it was just more representation...of what I already have."

[07 continues to scroll through his blog, showing more photographs – well lit and well framed, in my opinion – of his physical model, stopping at a view including a cut-out human figure.]

07 "Showing scale..."

**End of the 'Retail Space Project'**

[07 begins to discuss the “other project”, the Greenwich Peninsula. His blog shows photographs of the context, a photographic timeline, demographic information.]
Appendix C – Transcript of video-recording of respondent 11’s interview (produced by external transcriber and with information on sketchbook material revealed and on discursive moves added by the researcher)

This is included to illustrate how a professional transcriber documented verbal interactions between the respondent and the researcher in written form; and how the researcher documented non-verbal interactions between the respondent, the researcher and the sketchbook material; and the content of the sketchbook material.
[Respondent 11 was a Level 5 (Year 2) Interior Design student at a former polytechnic. She brought to the interview a Level 5 sketchbook containing preliminary work mostly concerning one project, the Museum Project.]

Start of the 'Museum' Project

GL "...So what have you brought here?"

11 "We were given the option to choose from loads of different buildings, to create a new function for them...I decided to focus on Treadgolds Museum, which is in Portsmouth, it just used to be an old workshop, so yeah, this is just the initial page, [inaudible 00:00:25 – “title page”, I think]."

GL "What kind of museum is it?"

11 "Well it was, initially when it was first built, it was built as houses and then it became an ironmonger’s...and then after that closed, it became a museum displaying stuff that they used to make in the ironmonger’s...It’s got loads of layers of...adaptations to the building...so it’s not just one solid block, houses have been added, workshops have been added and removed and..."

GL "And you’ve got to do something to it?"

11 "Yeah.

GL "...And this is the first page, you chose this museum..."

11. "Yeah. This was inside the building [11 waves her hand over the freehand perspective sketch], that’s why I drew that...it’s not just a random drawing!" [11 is discussing 1 paper-based freehand perspective sketch, drawn with a pen, of a weighting/balancing device.]

GL 'It’s interesting that you start with a drawing...why is that...?'

11 "...I just like to get the feel of the building and by doing...by drawing out what’s inside, I find it a lot easier to...understand like textures, so I like seeing the inside..."

GL "Okay. That’s very helpful."

[11 turns a page to reveal 1 copy of a black-and-white photograph of workers (perhaps Victorian) standing outside the building, plus 1 paper-based freehand sketch, in pencil with tone added, of chains, plus 1 page of hand-written text: “Treadgolds, Ironmongers of Portsea...Originally formed in 1404 as houses...” – secondary research information, I think. There is also a number of paper coasters used, I think, as reminders of work to be done. The one I can see reads “structured analysis.”]

11 "...So then I started to look at the history of the building...just looking at who owned it before...And yeah, just about the history of the Treadgolds. [11 turns a page in her sketchbook to reveal 1-and-a-half pages of hand-writing. She writes neatly and stylishly. The text seems to concern wider secondary research: “Portsea” and “Dockyard”. Next to this is 1 paper-based freehand perspective sketch, drawn with a pen, and hand-rendered, of a set of wheels – some sort of Victorian machine, perhaps? There is also a number of paper coasters..."
used, I think, as reminders of work to be done. The one I can see reads, _inter alia_, “dockyard” and “history of area – Portsea.” [11 immediately lifts up the coasters, presumably to enable the work underneath to be seen more clearly, but by doing this she conceals other work previously visible in the sketchbook. She moves these coasters 3 times.] Still looking at what was in the surrounding area, so looking at the dockyard and things, how it’s all machinery and…industrial kind of buildings.”

GL “So we’ve got drawings on just about every page at the moment…what are you trying to do with this drawing? Why did you provide that?”

11 “Just to show how the proximity between the museum and the dockyard…just to show the relationship that it has…they have to each other.”

GL “And what have you got there?”

11 “That was inside the building, just a piece of machinery that I quite liked, so I thought…”

GL “So you’re…drawing things you like and you’ve noticed…because you think “I might use that one time” or…?”

11 “Yeah, well further on there is a, well I have used it again…”

GL “…Okay, okay.”

[11 turns a page to reveal 4 photocopies of maps of Old Portsmouth. There is also a paper coaster used, I think, as a reminder of work to be done. This reads, _inter alia_, “Map” and “Layers.” [As soon as she has revealed these pages 11 lifts up the coaster and holds it aloft, without mentioning it. Just before turning the page below, she replaces it on the page.]

11 “…And then this is unfinished work, I’ve been looking at the layers of the maps and how it’s growing, the area…[11 turns a page to reveal 2 photocopies of OS maps showing the building location, marked up with circles linked to hand-written words: “Park”, “Portsea Library”, “Hydrotherapy Centre” etc] This is looking at what’s in the surrounding area, so…the museum is…here…This is kind of analysing what’s in the area.”

GL “What’s there, so by now you’ve visited the museum?”

11 “Yeah.”

GL “As…the first visit?”

11 “Yeah, well yeah, there’s pictures coming shortly!”

GL “And now you’re trying to find out…so it says there, there’s library, hypnotherapy…maritime club, okay…playing fields, thank you.”

11 “This is just, I made a Sketch-Up, just looking at the building and trying to understand the space, looking at the routes in the area, it’s all [inaudible 00:03:31 – I think “unfinished”], it’s not [inaudible 00:03:32 – I think “up to date”].” [11 has turned a page to reveal 1 CAD perspective of the building minus its roof, entitled ‘Site Analysis’ and marked with a north point and possibly a sun path (although it is incorrect if it is), plus two decorative, hand-drawn arrows seeming to mark building entrances. There is also 1 location plan (produced by another, I think) with 2 sheets of tracing paper over it, 1 marked with major road routes and the site location and the other 1 unclear.]

11 “And again that is looking at area, [11 turns a page to reveal 1 “site block plan (at 1:200)”, hand drawn with straight edges and colour-rendered (meaning/s of colours not absolutely clear: what appear to be building footprints and back yards have been colour coded with darker and lighter shades of blue respectively; an area behind these buildings has been marked out in grey and orange – probably the footprint of Treadgolds museum; and three
plots have been marked in green – front gardens, perhaps, or maybe commercial units?). This plan includes a key with the text “Retail” and “Residential”. Plus 1 paper-based freehand perspective sketch of a building exterior that’s just a [11 waves her hand over both pages in her sketchbook, left-hand page, then right-hand page] drawing of the building that’s opposite.”

GL “...So this is a more detailed version of...what you showed a few pages ago, and then what have we got here?”

11 “This is [11 points to the right-hand page, apparently in response to GL’s question]...what used to be a warehouse that’s opposite the museum but now it’s been turned into flats...so it’s already being reused. It’s unfinished as well [11 means the sketch].” [11 turns a page, apparently unprompted by GL, but then turns it back when GL says, “...You mentioned that a couple of times...” below.]

GL “...You mentioned that a couple of times, is that meaning you’re going to go back and finish these...?”

11 “…Yeah, it’s because it’s...not a finished project yet so it’s still...”

[11 appears to be about to turn the page, then retracts her hand quickly when GL says the following.] GL “...Is that partly because you’ve got more to tell us in these drawings...”

11 “Yeah.”

GL “…or because you just want the page to look more finished or...?”

11 “I find that I prefer it when there’s already something on the page and then I can then go back to it, just add in the little bits...so I like to layout and then it gives me time to think about it more and then go back and...add to what I’ve already done.”

GL “...Thank you.”

[11 turns a page to reveal a quite complicated array of images and text including: 1 paper-based freehand sketch elevation of the building (by this respondent, I think) with 1 tracing paper overlay marked up with arrows to show changes to the building over time; 1 timeline-dated hand-written list of changes to the building over time; 1 paper-based freehand sketch perspective of part of the building exterior; and other paper-based freehand sketches sticking out beyond this sketch perspective (quantity and content unknown).]

11 “And then this is analysing the building, like the exterior, just looking at [11 lifts one of the flaps to reveal the perspective underneath, and then quickly drops it again] what’s changed over time and how it has changed and things have moved up and down, or extended...”

GL “You’ve got text there as well...[11 turns her sketchbook, apparently to enable the text to be read] can you summarise some of the things that says?”

11 “…It’s just showing all the dates that the things, that...the building has...changed, so for example [11 is pointing to the paper-based freehand sketch elevation of the building] this was built, it was two-storey and now it’s one-storey...this was built [11 is pointing to the paper-based freehand sketch elevation of the building]...with a passageway underneath and now there’s not...this was initially [11 is pointing to the paper-based freehand sketch elevation of the building] two storeys...but became three...and it was extended and this [11 is pointing to the paper-based freehand sketch elevation of the building] was added and there were bits added at the back...so...”

GL “So you’re documenting that here, you’re drawing it here. Okay, please keep going.”

11 “That’s just [11 points to the perspective sketch of the building] another drawing of the exterior...it’s just a quick sketch and then...[11 turns a page (more of a flap, really) to reveal 1 paper-based section through the building created using needle and thread to show basic
outlines, marked-up with broken lines and with certain dividing walls highlighted] there’s something that we did in uni which was looking at seaming together, looking at seaming together for the layers of history and how they go back.”

GL “Why did you approach it that way?”

11 “It was just the way that we...were asked...it wasn’t mine...”

GL “So the approach up to date, is that something that you do which is mostly drawing based, there’s a whole range of drawing, some perspectives, some diagrams, some plan drawings, other things...is that your way of working or is that a way of working that you’re taught?...Or both?”

11 “…I’m not sure, that’s the way I like to work. I like to draw out everything that I see and then kind of get the feel...like I like to draw concepts and stuff...I don’t know, I’m not sure if everyone does it like this...”

GL “...So you're not aware that this is a kind of standard process. It works for you?”

11 “Yeah.”

GL “Okay, please keep going. Did this do anything for you [GL is pointing to the needle-and-thread section]? Once you’d done this?”

11 “…Well we did this before I’d even seen the building...so I wish I’d have done it afterwards...I didn’t understand the building so well when I first did this...”

[11 turns a page to reveal 4 sections (copies of drawings by others, I think) plus a mysterious collection of marks – lines, triangles, broken lines and squiggles. I think that these marks are perhaps on the reverse of the needle-and-thread page and do not need to be categorised.]

11 “This is just sections [11 turns a page to reveal 1 page with a lot of single-spaced word-processed text (research into the building, I suspect) plus 1 photograph of the building plus 1 timeline (“1700...1800...1900”) showing changes to the building summarised in text and a number of small paper-based freehand diagrams showing the street elevation of the building, plus (hidden beneath a flap) another copy of the CAD perspective of the building minus its roof tabled earlier (but now with the north point shown pointing in the opposite direction), plus a coaster with text on it: “Stick in plans w/ colour of interventions”] and then this is [11 lifts up a flap containing the word-processed text, to reveal the CAD perspective underneath it] a timeline looking at the, again the interventions that...were made in the building...[11 moves the coaster slightly] so using diagrams and stuff [11 points to the timeline] [inaudible 00:07:16 – I think “so kind of doing the time”].”

[11 folds down the flap she had lifted a few moments ago, then turns another page to reveal 1 set of 4 layered paper-based freehand bubble diagrams showing arrangements of bigger and smaller rectangles – layout options for the plan of the building – underpinned by a tartan grid laid on a plan of the building (drawn by the respondent, I think) and 1 set of 3 layered paper-based freehand bubble diagrams showing arrangements of bigger and smaller rectangles – layout options for the plan of the building – underpinned by a tartan grid laid on a plan of the building (drawn by the respondent, I think).]

11 “And then this is kind of looking at the [11 begins leafing through the layered sheets on the left-hand page, then drops them without discussing any sketch in particular]. I’ve got plans underneath, I’ve got to trace over...looking at the different spaces I have to work with and because it’s quite a complicated building [11 picks up the layered sheets on the left-hand page, then points to the plan of the building] and the structures...so it’s just breaking the spaces up to see what kind of areas [inaudible 00:07:36 – I think “like using a grid”] seeing what kind of areas they were [11 begins leafing through the layered sheets on the left-hand page again].”
GL "...And the layers mean what?"

11 "[11 begins leafing through the layered sheets on the right-hand page] It's just different...like different methods of like breaking the spaces up [11 drops the layered sheets without discussing any sketch in particular]."

GL "So we've got the big space, the nearly quite, not quite so big, that could then be divided into two...you've got a space in between so there is a basic structure that you're beginning to explore possibilities?"

11 "Yeah."

[11 begins to turn the page then stops when GL speaks below.]

GL "...And you don't have any idea of a plan yet...?"

11 "No, no, this is just..."

GL "...You're...analysing?"

11 "Yeah, I'm analysing the building...structure. And then...[11 turns a page to reveal 6 (maybe more – I can't be sure) photographs of a site model made out of laser-cut MDF (I think) plus 1 paper-based freehand sketch perspective of the building] this was a group site model that we made...just looking at the area [11 turns another page – more of a flap in the sketchbook, perhaps – to reveal 1 more paper-based freehand sketch perspective of the building] and these are some sketches that I did to try and work out what to do. [11 turns another page, passing – and possibly pausing in front of – another photograph, but not explaining/discussing it].[11 turns another page to reveal 1 photograph of an old, battered brick wall, plus 2 watercolour rendered elevations showing brickwork (plus word-processed labels with text too small for me to read, plus a sheet of tracing paper with nothing marked on it) and (I think) corrugated iron, plus 1 photograph of timber joinery] And then at the start, we went to visit [11 lifts the photograph (which is on a flap) to reveal the sketch underneath] I'm not really that happy with this I'm not really that happy with this [11 is gesturing to the watercolour rendered elevation showing brickwork, and then drops the flap she had lifted] but it's kind of...looking at the materiality, like the materials...within the building."

GL "So textures, exposed very old brickwork..."

11 "Yeah, it's really old, I mean some of the stuff inside used...17th Century...ship...timbers, quite industrial when you go inside."

GL "And...you say you're not very happy with this, what would make you happier with it?"

11 "...I don't know, to layer stuff, I probably should have layered some more [inaudible 00:09:00 – sounds like “humous” but can't be] underneath the trace...and maybe not stuck that image there [11 is pointing to the photograph of timber joinery]...I will add some text later on, when I come back to it..."

[11’s sketchbook has a number of pages that contain smaller pages that fold in like flaps, making a more layered, interactive and connected sketchbook.]

GL "...And that coming back, you were telling me that that's a thinking thing, it's not just making it look better, it's you come back because you've...given it a chance to kind of..."

11 "Settle down..."

GL "...Okay. Right."
11 "So then this is also inside the building [11 taps the photograph of the building interior with her hand] and...[11 lifts up the abstract watercolour] then this is an artist, Leonardo Drew [11 has revealed 1 photograph of a Leonardo Drew installation that, arguably, has some of the same qualities as the ironwork and abstract painting already discussed. 11 points to the photograph]. I really liked that [11 points to the photograph again] because I thought it kind of matched well [11 points to the adjacent photograph of the building interior] with the stuff that was inside." [11 has lifted up the abstract watercolour to show 1 page of paper-based pencil sketches of the iron artefacts.]

GL "...How did you find this artist?"

11 "Just Google. I love like...installations...art...sculptures...and things so I kind of use that [inaudible 00:09:51 - "inspire my work", I think] quite a lot."

GL "So you've done some research that's broader now...bringing that into it..."

11 "Yeah."

GL "And then we have a photograph..." [GL points to the photograph of the building interior, and then 11 points to the same photograph.]

11 [inaudible 00:09:59 – I think "Yeah, of the interior"]

GL "...Not many photographs in this sketch book."

11 "There will be more...that will come..."

GL "Yes, it's not a criticism...Then we've got drawings...that look a bit like you've started of things on the...?"

11 "...This is the stuff that there is inside and this [11 points to the abstract watercolour] is just rough kind of, wanted to create like a, I don't know, a weird feeling."

GL "A response to it."

11 "Yeah...to the objects inside. 11 "Yeah...to the objects inside." [11 folds down the flap showing the Leonardo Drew installation and turns the page in her sketchbook...]

[11 reveals 5 photographs of the museum interior showing old artefacts and a generally brown colour scheme.]

11 "And then here..."

GL "...At the moment...where are you in this project here?"

11 "...Still about concept."

GL "You're analysing, you're reflecting on it, okay..."

11 "So this is all stuff that's inside, these are my pictures of the interior, I've started doing...I haven't finished these again so...[11 turns a page to reveal 2 photographs of the building accompanied by 2 paper-based freehand perspective sketches that show, at a large size, elements also shown in the photographs] I have started doing some sketches of stuff that is..."
there, but I would like to keep that as well…looking back on it now because now I know quite a bit more what I want to do…"

[11 turns a page to reveal 1 photograph of the building interior accompanied by 1 paper-based freehand perspective sketch that shows, at a large size but very sketchily, elements also shown in the photograph, and then immediately turns the page to reveal 1 paper-based freehand sketch section showing a rooflight, 1 photograph showing an interior view of a large rooflight, and 1 paper-based freehand sketch perspective, watercolour rendered, with a sheet of tracing paper laid over it. There is also 1 coaster containing the words, “add pic of metal roof”.

11 “So then this is just the structure, the space…the lines…the window at the top.”

GL “…That’s an image that makes me ask did you come here already having a…skill at drawing and painting?”

11 “Well…I initially applied…here to do television and film production and then I had a year out, ‘cos I love drawing so much, it was like “I want to do something where I can actually use that”…I did art for A Level as well so it kind of led from there…So that’s just window…”

[11 turns another page.]

11 “More unfinished pages [11 turns a page to reveal 1 photograph of a covered courtyard in the building, plus a paper-based freehand perspective sketch (quite sketchy); then another page to reveal 3 photographs of the building interior, plus 1 paper-based freehand perspective sketch (quite sketchy)]...and then here the structure…” [11 turns a page to reveal 4 more photographs of the building interior plus handwritten text: “18th C staircase”.]

GL “Now, the photographs…what job are they doing in this sketchbook? [11 begins to leaf back through her sketchbook to reveal 3 photographs of the building interior, and then to reveal 1 photograph of the building interior, plus 1 paper-based freehand perspective sketch (quite sketchy).]

11 “I just wanted to show the space, the things that initial, that massive space at the back, just kind of show its…”

GL “…Why didn’t you draw it? Again not a criticism, it’s a question…”

11 “…I guess it’s easier, when you have a photograph…just draw it from that, I think when we were in there as well, we didn’t really have…much time.”

GL “So it’s a shortcut to get…some information but then you carry on with the drawing?”

11 “Yeah.”

GL “What does the drawing give you that the photograph doesn’t?”

11 “It gives me more of a depth I guess, a photograph I find is quite hard to catch, like get the whole kind of, because it’s quite limited sometimes…to understand, I mean there is an app on the iPhone now which is you can do panorama…which is quite good I find…when I’m trying to understand a building because…I can see the depth of it.”

[11 turns several pages in her sketchbook…

11 “That’s just…”

…to reveal 2 images of the building interior. Most of the images seen thus far show ironwork or material textures. The first image here shows 1 layered collage of images previously seen:
photographs of the rooflight and brickwork textures, and paper-based perspective sketches of the ironwork. The second shows another photograph of the iron tools once made in Treadgolds, hanging on a white wall."

GL "There’s still hardly any words."

11 "Yeah, I know, that comes later..."

GL "Yeah, you know, I’m really interested because...other places as a student, it’s words, words, words...hardly any drawings, you come here and it’s..."

11 "...[11 laughs] All images."

GL "But, you know, there’s plenty of thinking going on as well...

11 "...This [11 points to the photograph that shows a collage of 5 or so images previously seen: photographs of the rooflight and brickwork textures, and paper-based perspective sketches of the ironwork] is something that I made which is like a [11 waves her hand over the left-hand page, then the right-hand page] [inaudible 00:13:16 – I think “palimpsest”],...and then you’ve got the [11 points to various parts of the collage as though trying to highlight certain parts of it as she described it] window and then there’s that initial sketch from the beginning...just kind of layering [11 gestures as though – I think – trying to indicate “layering”] different textures that I found in the space and then that’s [11 gestures to the photograph] another photograph taken of the objects inside."

[11 turns a page to reveal 6 photographs of the building interior, all showing either ironwork, materials or furniture. There are other photographs – loose ones – laid onto the page.]

11 "And this is more [11 waves her hand over the left-hand page then picks up a pile of loose photographs from the right-hand page, holding them aloft] looking at materiality, of the interior, these [11 returns the pile of photographs to the right-hand page in batches] are the [inaudible 00:13:34] go inside and take a picture [11 picks up the loose photographs again, and then puts them down again]."

GL “Do you feel you’re getting somewhere at this point? Are you...gradually understanding...?"

11 "Yeah, I’m starting to understand, I think especially [11 flicks – somewhat vaguely, I think – back through her sketchbook, discussing nothing revealed, and then returns to the pages currently being discussed] doing the...timeline and the layers...I found that helped so much...to understand, like the shape of the building and then going like for a second visit after doing that...kind of really helped me to...understand it."

GL “Right.”

[11 turns a page to reveal 3 photographs of a sketch model of the existing building.]

11 "And then...so I made a rough sketch model...[11 gestures to the empty paper next to the third photograph] there would be stuff there and then [11 turns a page to reveal 2 photographs of a sketch model of the existing building] this was a group model that we made [11 waves her hand over 1 of the photographs] of the whole building...looking at the spaces [11 turns a page to reveal 4 photographs of interior spaces in that sketch model], looking at different views inside..."

GL "Why were you asked to make a group model and you made your own model?"

11 "...The group model was our choice, we decided to do it all together because...it’s such a complicated building...we felt...it would be easier if we all worked together...This sketch model [11 lifts up the preceding page and taps the photograph sketch model that is visible] was just something that I did..."
GL “And…why did you do it?”

11 “Just to try and help me understand it…but then all of these different kind of making models and drawings and making it on Sketch Up, it…has all added together…helped me analyse the structure.”

GL “Can you give me a sense, where are we in terms of the timeline of this project? Are we a week in or five weeks…”

11 “We've only been working on it since January so…it's just from there until now, this [11 points to one of the photographs] is probably…I’d say about three weeks ago.”

GL “Three weeks ago so…”

11 “…A month and a half in…”

GL “Okay, that’s helpful, right.”

[11 turns a page to reveal 2 photographs of interior spaces in the group sketch model.]

11 “See this is just more images…and there [11 turns a page to reveal 1 page of hand-written text (notes on a precedent study, I think, entitled “Documentation Centre in…” and including “uses metal spear to cut through building”, “leads them through the space”, “harsh details & shapes reflect history” and “has exhibition spaces connected in foyer”), plus 1 mysterious paper-based freehand diagram showing a rectangle nesting in another one, both crossed by a shaft of some sort, plus 1 photograph of a bricky, steely precedent study, plus 1 comment on a paper coaster: “add scans from book”) I'm just analysing some precedents…so looking at [inaudible 00:15:42 – I think “ones that keep the”] [11 moves the coaster from the left-hand page to the right-hand page, and points to the photograph on the right-hand page] brickwork. [11 turns a page to reveal at least 7 photographs (all but 3 of them loose) of the interior of what looks like an old, stone, concrete and steel building that appears to celebrate material textures, with the hand-written label, “Castle Vecchio” looking at Castle [inaudible 00:15:43 – I think “Vecchio”]…which was [inaudible 00:15:48 – I think “awesome, I love that”] looking at Castle [inaudible 00:15:43 – I think “Vecchio”]…which was [inaudible 00:15:48 – I think “awesome, I love that”] and then just some more precedents [11 turns a page to reveal 1 photograph of the Turbine Hall, I think], plus comment on a paper coaster: “add scans from book” and [11 turns a page to reveal secondary research material concerning the Tate Modern: 1 axonometric view of the building (the Turbine Hall, I think), plus text concerning the Bankside Power Station] I've actually put a bit of my dissertation [11 unfolds her dissertation, making it slightly more visible]…because it kind of relates…to the idea of using, reusing industrial buildings.” [It seems that the text referred to above is actually from her dissertation.]

GL “…So you've got the Tate Modern there.”

11 “Yeah…Yeah, [11 folds up her dissertation to reveal a single photograph of the Turbine Hall] because the function that I kind of want to do for this building, from analysing the area [11 lifts up pages in her sketchbook as if about to flick backwards, but does not then do so], [inaudible 00:16:13 – I think “kind want to add”] like an art gallery, a workshop, a community space…where the local area can use.”

GL “…What you've just told me…does that appear in your sketchbook [11 begins ‘toying with’ her dissertation, lifting pages in what seems to me to be a fairly vague way] later? This insight that…you want it to be a certain kind of function…?”

11 “Er, no I haven’t [inaudible 00:16:29 – “got that yet” I think].”

GL “…But it's emerging. Had you got there by now then…?”
“Yeah, that’s why I chose these precedents [11 flicks back through her sketchbook, revealing one, then another precedent already discussed, but returning to the page with the photograph of the Turbine Hall]… because obviously Castle [inaudible 00:16:38 – “Veccio”, I think] is a museum… and it’s also art gallery [11 gestures to the photograph of the Turbine Hall], and I completed my dissertation on [11 unfolds her dissertation but does not point to any items in it]… reuse of industrial buildings [inaudible 00:16:47].”

GL “Okay.”

[11 turns a page to reveal 3 photographs of building interiors showing almost monochromatic spaces (a bit like the photographs of the site referred to above) with an emphasis on steel, concrete, glass and stone (a bit like the precedent images referred to above), plus 1 comment on a paper coaster: “media centre…burg…um”]

11 “And this is just some visual precedents, looking at [11 moves as if to turn the next page, then lowers the page and gestures to the photograph on the right-hand page] materials, the contrast between old and the new.”

GL “You were discussing this with your tutor every… week?”

11 “Yeah, yeah… [11 turns a page to reveal a block plan of Old Portsmouth (someone else’s image, I think) plus 3 photographs, 2 on a flap and 1 underneath the flap] And then this is looking at art galleries that are actually within the local area… [11 points to the 2 of the photographs on the flap] so this is one called Round Tower which is in Portsmouth… [11 lifts a flap with 2 of the photographs, revealing the photograph underneath (which she does not mention) then turns a page to reveal 3 more photographs which she then goes onto describe] this is Aspects Gallery… which is also in Portsmouth [11 turns a page to reveal 2 more photographs which she then goes onto describe]… This was John, I think it was the John Palms [I think “Pound”] Centre maybe… it’s not in Portsmouth but it’s basically looking at displays… sculpture displays… I’m quite interested in sculptures… just kind of looking at that [11 turns a page, then lifts the loose photographs, revealing what is underneath them. Altogether there are 5 or more precedent photographs, some loose, but does not stop to discuss these or allow a clear view of them] and then… just some more Scarpa stuff…”

[11 passes two blank pages (well, one has an illegible hand-written statement on it), to reveal 1 mind-map that appears to have the title “Gallery”, plus a number of statements (“display objects from tredgolds – local artists/students – maybe/what?” “flexible”, “space for talk”, “tell a story - narration”, “open yet enclosed spaces”, and “setting the stage for artwork”), plus 2 photographs of a gallery interior, one quite dark and from the same stable (I think) as the photographs discussed above, and one more of a ‘white cube’ interior, plus 1 tiny paper-based freehand sketch perspective diagram showing a “layered space”. The photographs are adhered to a loose page. 11 lifts the page of photographs revealing more of the mind map.]

11 “And then this is kind of looking at what’s needed in the gallery space…” [11 is lifting the right-hand pages as though about to turn it.]

GL “…so we’ve got tiny [11 drops the right-hand page as GL points to it] – because you’re hardly drawing at all now – you’ve got… lots and lots of photographic material, a little sketch there [11 lifts the right-hand page again], layered space maybe.”

11 “Yeah, that was… Then [11 turns a page to reveal 2 photographs of what look like Le Corbusier’s studio] I haven’t finished this one [11 points to an empty page next to the photographs of Le Corbusier’s studio which contains the word, “Studio”], looking at what should be in the studio space…”

11 “And then [11 turns a page to reveal, on the left, several layers of paper-based freehand space planning bubble diagrams sketched on tracing paper over a plan of the existing building, plus arrow lines and words (“Shop”, “studios”, “gallery space/shop” etc), plus, on the right, one layer of paper-based freehand space planning diagrams sketched on tracing paper over a plan of the existing building, plus arrows and words (“2nd floor”, “gallery”, “studios”.)
“gallery space”, “offices” etc. I think I can see 3 diagrams in all kind of working out [11 waves her hand over the left-hand page; GL gasps] where I want to put different things so …I made a list of the rooms [11 appears to be tidying up her sketchbook by lining up a loose sheet that had become unaligned] that… I needed.”

GL “And where’s that list, is that elsewhere?”

11 “Yes, it’s somewhere else, actually I think it might be [11 turns a page to reveal 2 paper-based freehand perspective sketches showing ideas for the building interior, one in ink and one in pencil with shading, plus a list of “the rooms that I need”: “gallery”, “café”, “toilet” etc]…it’s on this one…But that’s just sketches that I’ve added in.”

GL “So now you’re in a place where…you’ve got a concept?”

11 “No, not yet…I’ve just got all the information and now I want to developing…the concept.”

[11 turns a page back to the layered bubble diagrams and space planning diagrams mentioned above.]

GL “So you’ve got a kind of feeling for this building…haven’t you…?”

11 “Yeah.”

GL “You’ve got a…set of functions, you’ve got a list of what the spaces maybe…and in you go and you’ve analysed the building, so in we go now.”

11 “This is just looking at kind of where I want to put things, so obviously because the larger space [11 waves her hand over the left-hand page] is at the back, I wanted to break that up and turn it into the gallery space, then [11 waves her hand over the left-hand page] the [inaudible 18:56] studio’s at the back, the café, shop…”

GL “And layered…” [GL lifts up one of the layers of tracing paper to reveal another paper-based freehand space planning bubble diagram, and then another.]

11 “This is just…testing several different ways…”

GL “…Right, working off the existing…right, okay?” [11 lifts up the right-hand sheet, but this may have been because GL had been lifting up the left-hand sheets. 11 then drops the sheet and turns the page.]

11 “So then from there [11 turns a page to reveal 3 photographs/downloads showing material samples plus another palimpsest image that seems to incorporate images of these samples], I started looking at the materials I kinda wanna to use, [inaudible 00:19:13 – I think “within my insertion”] and then other [11 points to the collage] layers…that I done on Photo Shop.”

GL “…Palimpsest.”

11 “Looking at [11 points to the collage], with the materials and the [inaudible 00:19:22 – I think “existing”] materials that I could see in there.”

[11 turns a page to revisit the 2 paper-based freehand perspective sketches showing ideas for the building interior, 1 in ink (rather free in execution) with, perhaps, a chalk rendering, and 1 in pencil (not as free in execution) with, perhaps, chalk shading, plus a list of “the rooms that I need”: “gallery”, “café”, “toilet” etc.]

11 “…And then, this is just really rough, looking at stuff that I found within the building, there’s lots of…metal, iron.”

GL “May I ask, at this point are you working in any other mediums…?”
“Yeah.”

GL “What else are you doing?”

11 “Oh sorry, no I'm not…I mean I’m using Photo Shop and…then this is just…”

GL “…You don't have another lot of images or another big sketch book that you're…using at the same time?”

11 “…Well I work in a different sketchbook and then stick in…my images after organising because otherwise…it all just gets too jumbled and it's…drawings everywhere, so I have to do it separately and then stick it in and do it.”

GL “…This is the one where you're bringing it all together is it?”

11 “Yes, this is just kind of like bringing it together. [11 points to the pencil sketch – her gesture does not make this clear] This was actually from a different unit I think…where we looked at mapping but I think I found it kind of links…with what I was doing anyway.”

GL “And…it's quite a small sketchbook… in size, you don't...?”

11 “Well I do have a big A3 one where I do my perspectives…which I hand draw in usually.”

GL “And have you got that here?”

11 “No…sorry…” [11 laughs.]

GL “…So you've got this and…would you say this is your main sketchbook…for the development work?”

11 “Yes, this is my main one.”

GL “Right, we'll keep going then.”

11 “So these are just sketches kind of looking at different ideas [11 appears to be referring to the 2 paper-based freehand perspective sketches showing ideas for the building interior.] [11 turns a page to reveal a number (maybe 6, maybe more) of paper-based freehand sketch diagrams showing ways of arranging rectangles of different sizes, plus 1 paper-based sketch perspective showing a 3D arrangement of rectangles, plus a number (at least 3, maybe more) of loose digital images showing ways of arranging rectangles of different sizes. At least 1 of the diagrams has been mounted on a flap, then drops it again] and now I'm trying to develop the concept, so I kind of wanted to do something that was quite…square…[11 lifts up another flap containing 2 diagrams, revealing another diagram underneath, then drops it again] looking at like responding to the existing structure, I found it was quite boxed so just looking at…geometry, square things…layering different…” [In fact, it is now clear that the digital images are not loose but on flaps.]

GL “Okay.”

[11 turns a page to reveal 2 paper-based freehand sketch perspectives showing possible proposals for a double-height interior space with adjacent balconies (one of which is shaded with soft pencil), plus 1 paper-based freehand sketch section for, I think, the same space.]

11 “…Just sketches, I've done this before, kind of developed my concept which I don't usually do, usually I have a concept and then sketch so these are really rough…just…”

[11 lifts the right-hand page as if about to turn it.]
GL “Right.”

11 “…kind of looking at what I can potentially do within the space. [11 turns a page to reveal 2 paper-based freehand perspectives showing rectangular forms, plus 3 photographs of precedent study images showing a gallery spaces] And then looking at some precedents, that use kind of square shapes…several sketches.”

[11 turns a page to reveal 4 paper-based freehand sketch perspectives and 1 paper-based freehand sketch section, all showing proposals for a central, double-height central space.]

11 “…Just some more sketches…” [11 lifts the right-hand page as though about to turn it.]

GL “…Section perspectives…”

[11 turns a page to reveal 2 paper-based freehand sketch perspectives showing proposals for a double-height space (1 sketch with a sheet of tracing paper over it showing further sketch perspective ideas), and 1 paper-based freehand sketch section showing proposals for the same double-height space.]

11 “And then this [11 lifts the tracing paper sheet, revealing what is beneath it] kind of that main central area [11 drops the tracing paper sheet, concealing what is beneath it], for what...I can potentially do with it [11 lifts and then drops the tracing paper sheet, revealing what is beneath it]. It’s just…”

GL “…I’m used to…seeing drawings like this but they would have a lot more text added to them, just as the designer is…”

11 “Sorry.”

GL “… thinking and then documenting their thoughts...do you not need to document your thoughts in that way?”

11 “[11 laughs] I probably should but...!”

GL “…It’s not the point, okay…”

11 “I like to just do it all and then go back to it.”

GL “You think you might go back and then add...a narrative that kind of explains what you’re trying to do…”

11 “I do it with most of my projects, I’ll leave it...blank and then go back and add the writing in...which is probably not the best way of doing it, thinking about it now [11 laughs].”

[11 turns a page to reveal 1 small paper-based sketch perspective showing a corridor, 1 small paper-based sketch perspective/isometric showing (I think) the same corridor, 1 paper-based freehand sketch perspective showing proposals for the double-height central space, and 1 paper-based freehand sketch perspective showing, from above, a floor area/deck which has 1 sheet of tracing paper laid over it showing further paper-based freehand sketch perspective ideas: a spiral staircase (I think) and a void space (the same double-height space, I think).]

11 “…Just some more sketches [11 lifts and then immediately drops the tracing paper sheet, then points to the sketch on the tracing paper sheet], looking at...the existing things, and how I could maybe [11 lifts the tracing paper sheet again, then drops it] use them within my design and [11 turns a page to reveal 2 paper-based freehand sketch perspectives, 1 of a route/corridor linking a series of volumes, and 1 showing (I think) the central double-height space, and 2 paper-based freehand sketch diagrams showing ways of linking rectangular shapes (perhaps by means of bridges)] then it’s just more sketches [11 lifts the right-hand page as though about to turn it, then drops it immediately, then points to the left-hand page]...and this [11 points swiftly to the left-hand page, and then the right-hand page] is kind
of led me [11 turns a page to reveal 1 paper-based freehand sketch perspective showing that
double-height central space again, in quite a lot of detail, plus 1 paper-based freehand sketch
diagram showing ways of linking rectangular shapes (perhaps by means of bridges)]…to then
start [11 points to the sketch on the right-hand page, then immediately 11 turns another page
to reveal a paper-based freehand perspective showing the double-height central space quite
expansively, plus a number of loose pages including 1 photocopy of a plan of the existing
building (drawn by another) plus 1 paper-based freehand sketch diagram on a tracing paper
overlay showing an arrangement of rectangles mapped over the plan]…that’s the plan [11 lifts
the loose paper-based freehand sketch diagram on a tracing paper overlay to reveal the 1
photocopy of a plan of the existing building, then puts it back down again] [11 turns a page to
reveal 1 sort of sketch relief model showing rectangles of card stuck together to indicate a
sort of plan, plus at least 1 similar sketch model in paper] to get my concept going [11 lifts up
the sort of sketch relief model showing rectangles of card stuck together and puts it down on
the opposite page, revealing the similar sketch model in paper underneath]…this is where I
am now, so I’ve sort of started layering…”

GL “Alright [11 taps the sort of sketch relief model showing rectangles of card stuck together
quite firmly].”

11 “…layering…squares…” [11 lifts up the similar sketch model in paper, then puts it down.]

GL “What are you doing there? What’s that?”

11 “It’s just, I don’t know, layering different, layering shapes to create a…bigger space, so like
pathways…”

GL “And are these spaces…that are separate areas within your…?”

11 “Here from now and then start sketching…I use this to kind of refine the idea
of…layering…”

GL “Alright.”

11 “[11 goes off camera to pick up a plastic bag, and appears to show it to GL. The contents
of the bag are not at this moment visible on screen] I did bring some, these are what I’m
going to be doing this week…so it’s all just initial, just kind of looking at ways of…”

GL “…Now if I move that up a little [GL moves the sketchbook], so what we have here [GL
tables 3 more relief models, these made out of foamboard (1 combined with some grey card)
which he appears to have received from 11] you’ve now moved from…a more 2D approach
to…a more 3D approach. So these are speculations I think you’re saying on how you might
layer spaces…”

11 “So now I kinda want to insert this into the building so now I’ll kind of use these shapes
and like [inaudible 00:24:14 – something like “cos there a lot of] gaps that are created.”

GL “…Are these relatively literal in terms of we could find these within the existing
building…?”

11 “No, these spaces that…I insert into the…”

GL “Abstract.”

11 “Yes, just really abstract…conceptual and then from here I’ll kind of refine them….more…”

GL “So that’s where you are now and if we go back a page or two [GL turns back several
pages, assisted by 11, to reveal the paper-based freehand sketch diagram showing ways of
linking rectangular shapes (perhaps by means of bridges)], I think it was, that’s it, so we’re
seeing a kind of…”
“This one?”

GL “...[11 turns back another page or so to reveal a number (maybe 6, maybe more) of paper-based freehand sketch diagrams showing ways of arranging rectangles of different sizes, plus 1 paper-based sketch perspective showing a 3D arrangement of rectangles, plus a number (at least 3, maybe more) of loose digital images showing ways of arranging rectangles of different sizes] That’s it [11 folds down 2 of the flaps containing diagrams], and then we’re...starting to see this layering of...one form on another and it begins with this work [GL points to the digital images] and whose is this work...?

“...This is from a book that I have about...the geometry of squares...don't know who it’s by...but I have it...[11 laughs]...”

GL “And who led you to that? Did you just pick that up because you thought, “I'll try that?””

“Yeah! [11 laughs] Pretty much...There was just a black square on the front of the book, so I quite liked it!”

GL “This feels like a very personal journey that you're on here. At what points do you speak to your tutors about it?”

“Once a week.”

GL “...Do they draw in your sketchbook?”

“No [11 laughs].”

GL “...Do they give you written comment that you would add in your sketchbook?”

“It’s just usually a discussion that we’d have...and then I’ll take that away with me.”

GL “...So where next with this project?...You've now finished have you, the sketchbook I mean?”

“Well, I’ll going to keep sketching, drawing. I think I need to, what I was going to do is start to extrude these shapes up [11 is pointing – somewhat vaguely, I think – to the loose models laid out earlier], like...sketching, so kinda do some perspective, extrude them all up to kind of look at different layers I can [inaudible 00:26:17 – I think “use”].”

GL “I see. So having produced these three dimensional artefacts, you're then going to return to sketching, to perspective sketching and do these relate back to the model, the...sketch planning that you did a few...[responding to GL’s starting to leaf back through the sketchbook, 11 has turned pages to reveal the paper-based sketch bubble diagrams and sketch plans discussed above] there, do they relate back to that in any way?”

“No, but I was gonna start to bring it all together now.”

GL “...Have you got anything else that you...want to show me?”

End of the ‘Museum’ Project

“...I've brought a project that I have finished. [11 puts away the models and closes the sketchbook] This one was from last year so it's not...”
Appendix D – Openly coded transcript of video-recording of respondent 04’s interview

This is included to illustrate how the researcher approached the open coding of a transcript.

University of Bedfordshire
Institute for Research in Education (IRoD)

PILOT STUDY
RESPONDENT 04 TRANSCRIPT – clip-2013-02-13 12;02;51-04 – 39.13 DURATION
13/02/13

Encoding commenced Saturday 30/07/13 and completed 31/07/13
Re-encoding commenced Monday 05/08/13 and completed 17/08/13

Starts at: 00.00.00

Respondent 04 was a Level 6 (Year 3) Interior Architecture student. She brought to the interview three Level 6 sketchbooks, covering last term and the current term. The following are excerpts from the interview.

Notes made on playing the video.

[The interview began after GL, with 04 not present, had a minor disagreement with a work colleague. This caused GL to feel rather tense and distracted throughout the interview, which led to him rushing the interview somewhat.]

Beginning of the Dalston Project

[04 reveals a bold abstract-looking collage with hand-drawn marks added to it, plus two sketches – a perspective view of a pair of angular forms plus an orthographic (plan?) view of angular forms.]

GL “…Now, to begin…can you…what are we looking at here, what were you asked to do…that we are now seeing in this sketchbook?”

04 “…It was…a reflection on the, it…wasn’t actually the site as yet, it was a collage that we had to make as a reflection to the brief.”

GL “Right, so you were given a design brief which asked you to do what?”

04 “…It was a project on Dalston, making…don’t exactly remember much…as to what the first brief said…and, I think it was just…we knew that we were going to make something or design something which was going to be based on something…which was going to have a spiritual element to it. So…this is like a reflection on what I thought of the space. When I think of spiritual…so this is just me…making a collage of…a space where there is darkness, there’s an inlet to nature…so I’ve used, like, images of nature and the sky also.”

GL “…So you have assembled here a set of images…you’ve drawn on them, and that’s what we’re looking at here…and this is a one-off thing. Did you…produce earlier versions of this…that are not in the sketchbook? Or…you made it…from the beginning and here it is?”

04 “I think it was more like…[did sketch a little how…] I want to show the space enclosed [04 points to the two sketches referred to above]…so I thought of, like, a…triangular form, something like that, but it was more like built on when I had images I started ripping them off and pasting them and then what form it took…”

GL “…Right…And what then?”

Commented [k1]: REF-BRIEF-COLL – Reflect on the brief using collage
INV-OTH-DRG – Investigate visuo-spatial matters by drawing on images of other people’s work

Commented [k2]: REF-SITE-COLL – Reflect on the site using collage
REF-BRIEF-COLL – Reflect on the brief using collage
INV-OTH-DRG – Investigate visuo-spatial matters by drawing on images of other people’s work

Commented [k3]: INV-OTH-DRG – Investigate visuo-spatial matters by drawing on images of other people’s work

Commented [k4]: REF-SITE-COLL – Reflect on the site using collage
INV-DRG-PERSP-START – Investigate visuo-spatial matters at the start of a given design challenge using paper-based drawings that are perspective views
INV-DRG-PLAN-START – Investigate visuo-spatial matters at the start of a given design challenge using paper-based drawings that are plan (orthographic) views
[04 turns the page to reveal another collage and a sheet of hand-written text]. There’s another one, the same...

GL: “Can we just…you’ve turned over, but [GL turns back to the pages viewed previously] you’ve also got some sketches here, what are they about, what are you doing there…?”

04: “These are [more like very rough] just pictures of how I want to show the space. Like, how do I…perceive a 3D space?”

GL: “So…is this you already thinking what the design might actually be like?”

04: “No, it’s just…a drawing as an aid to make this [04 points to her first collage].”


04: “…Because I am trying to show an enclosed space…what form would that enclosed space be…?”

GL: “Right, so we have shapes here, which we see there [GL points to both pages visible in the sketchbook] as well. Okay. Thank you.”

[04 turns the next pages, to reveal another collage and a sheet of hand-written text.]

04: “And this is another one, this was more, by the time I had done this… I knew more of what I want to do with the next one so this one is [sort of sketchy and...”

GL: “And you were asked to do this, this is not something that you decided to do, your tutor said, Could you do it?”

04: “Well, this one was required [04 turns back to the previous collage]… but I thought that this one was… I just wanted to make another one [04 indicates the second collage]… because… I thought that… with this one, I was like sketching and I was seeing how, and I got another, while I was doing it, while making this I got another idea, so I thought, Why not make one on textures also?”

GL: “Right. Okay, and then we…find a sheet of text, of words. What’s going on here?”

04: “…I think it’s… I think… these are just some notes.”

GL: “Notes that…you made in a class… maybe concerning this project? So what have we got? Cost, delivery time, how long will it take, time for…? So was somebody speaking and you were writing down notes?”

04: “Yes…”

GL: “Okay, and was this your tutor?”,

04: “I think yes.”

GL: “…Okay, right.”

04: “I think…it starts off over here [04 points to page of hand-written notes] but then it goes onto me… trying to make some notes on the brief that we got… for… Aspects of Practice…”

GL: “Okay. So what we’ve just seen, these collages, you did them in your own time between classes or during…”

04: “Yes.”

GL: “Okay, okay, right. And then you went to a session and the result was, you made some notes. What’s over the page, please? Ooh, more words. And what looks like… what we might call a mind map [Quite a neat, orderly mind map]. What’s going on here…”

04: “…I think that these are again my own notes on how I want to go about making a CV and what [inaudible] the lectures from the… lectures… and how I want to go about it.”

GL: “…So you… got more than one task to carry out… here within the coursework, and this is you using words to map what your CV might look like, is that right?”
"...Yes, I mean what I want to include...and...[04 points to the second sheet of hand-written text visible] over here is more, like, what I want to do with the...Dalston project...and just some other notes of...links to look up [inaudible] [04 points to back the first sheet of hand-written text visible]..."

GL "Right. And these notes...?"

04 "And this is before we actually visited the site."

GL "So you were set a task, which was to create a collage inspired by...?"

04 "The brief."

GL "...The brief. [And you’ve written some notes. And where did these notes on this page...[GL points to the second sheet of hand-written text visible] come from, that’s your thinking about the project...or it’s your tutor suggesting things to do or what?"

04 "I think this...I think it’s a...I think this probably I made during the class because then I have bits of what the tutor said and then bits of what I, I’m writing myself...Because you were supposed to think of what questions, and what we want to look at when we go to the...site itself."

GL "Okay, right. Did you know anything about the site at that point?"

04 "Well, we just knew that where it was and...our tutor talked a little about what this place is like, and then I wanted to, you know, like, I think this is definitely me [04 points to the bottom of the first sheet of hand-written text visible], and what I want to question over there and what I want to look at, gender issues and design issues and children."

GL "Okay. Right. If you’re ready to turn the page, yes...happy for you to do that [04 turns the page to reveal more hand-written text, but no images]. So there’s still quite a lot of words, but you haven’t got to the site yet?"

04 "...No."

GL "And what are these...?"

04 "I think because I have two sketchbooks...This one is more like the formal one [when I...do my not so sketchy stuff in it [04 laughs]."

GL "Oh, that’s an interesting distinction. A formal one where you do your not so sketchy stuff. What does that mean? Can you explain that...?"

04 "...It’s more like this...These small ones are with me all the time, so whenever I think of something I just do them on there...And then when I want to make an action plan, and [like a proper diagrams and stuff], then I do them over here..."

GL "Okay. Right. It’s a page. So you’re ready to turn the page, yes...happy for you to do that...[04 turns the page to reveal more hand-written text, but no images]. So there’s still quite a lot of words, but you haven’t got to the site yet?"

04 "...No."

GL "And what are these...?"

04 "I think because I have two sketchbooks...This one is more like the formal one [when I...do my not so sketchy stuff in it [04 laughs]."

GL "Oh, that’s an interesting distinction. A formal one where you do your not so sketchy stuff. What does that mean? Can you explain that...?"

04 "...It’s more like this...These small ones are with me all the time, so whenever I think of something I just do them on there...And then when I want to make an action plan, and [like a proper diagrams and stuff], then I do them over here..."

GL "Okay. Right. If you’re ready to turn the page, yes...happy for you to do that [04 turns the page to reveal more hand-written text, but no images]. So there’s still quite a lot of words, but you haven’t got to the site yet?"

04 "...No."

GL "And what are these...?"

04 "I think because I have two sketchbooks...This one is more like the formal one [when I...do my not so sketchy stuff in it [04 laughs]."

GL "Oh, that’s an interesting distinction. A formal one where you do your not so sketchy stuff. What does that mean? Can you explain that...?"

04 "...It’s more like this...These small ones are with me all the time, so whenever I think of something I just do them on there...And then when I want to make an action plan, and [like a proper diagrams and stuff], then I do them over here..."

GL "Okay. Right. If you’re ready to turn the page, yes...happy for you to do that [04 turns the page to reveal more hand-written text, but no images]. So there’s still quite a lot of words, but you haven’t got to the site yet?"

04 "...No."

GL "And what are these...?"

04 "I think because I have two sketchbooks...This one is more like the formal one [when I...do my not so sketchy stuff in it [04 laughs]."

GL "Oh, that’s an interesting distinction. A formal one where you do your not so sketchy stuff. What does that mean? Can you explain that...?"

04 "...It’s more like this...These small ones are with me all the time, so whenever I think of something I just do them on there...And then when I want to make an action plan, and [like a proper diagrams and stuff], then I do them over here..."
“Yes.”

GL: “Your perhaps private thoughts about the project? In your own time?”

04: “Mmm, sometimes it, there is no clear distinction, like I’m sure I made this during the class [04 is pointing to a hand-drawn perspective sketch in the smaller sketchbook]... I was just thinking of stuff…”

GL: “And what were you… trying to do here with… these words [GL is looking at the smaller sketchbook here]? We should start with… talking about the nature of the space. It’s very open. We could say we needed to [inaudible]…”

04: “…insert certain features in it which give some kind of privacy, a sense of division.”

GL: “So you didn’t at this point feel you wanted to draw?”

04: “…I think when, when I’m, it’s just a, it’s different like, I think what to do with the… space, I think I write and I see and I make… diagrams, and then, then I go onto a little bit of drawing…”

GL: “Ah right, which will see, I guess, in time. And you don’t make models at this point?”

04: “No.”

GL: “You mention ‘carve the space’... which is a very spatial thing... it’s written there, but you… wouldn’t make a model to…”

04: “Not yet.”

GL: “…not yet? Alright, thank you.”

04: “Not very comfortable with model-making.”

GL: “Why is that?”

04: “[04 sighs]… I think because… it’s not that I… don’t have anything, you know, like… drawing I feel that I don’t have the skill to draw… I do feel… there’s no such thing as not having the skill to make a model… I think it’s because of my laziness.”

GL: “Oh do you think you’re a lazy, laziness in this context? Alright. So you think it might be helpful but you choose to do something that is easier, quicker?”

04: “…Yes.”

Up to: time left 25:44

04: “…I think, more than easier, quicker, which doesn’t involve a lot of, like, because it is like I can laborious…”

GL: “Thank you. Now, would you like to continue maybe, maybe we’re back at the big sketchbook are we [04 returns to the bigger sketchbook]. I’m not sure, it’s… sort of for you to help us… Right, so what have we got here…”

04: “I think I’ve gone to the site…”

GL: “Highlighted text here which is text about Dalston? Did you download this?”

04: “Yes.”

GL: “Alright. Because you were asked to or because you chose to and you found the text that was helpful…”

04: “I think this was…from the support material that the tutor gives us... it’s not essential to, I mean I think it’s not essential, but it’s good if you look at it.”

GL: “Okay. So you’ve highlighted lines of text, you’ve written notes, The area had a negative reputation… Flexible and affordable workspace, okay, right, and then onto the next page, what’s happening there?”
GL "...I'm in no way... critical, or even the other thing, of lots of text, I'm simply interested in what... we see here. So here we have text. What's going on here?"

GL "So what's the presentation on aspects of practice...? I see, so this is not directly connected to the project?"

04 "No..."

GL "And did it help you with the project?"

04 "...I think it was more about the bodies that are there to recognize you..."

GL "...So you're not designing here?"

04 "No."

GL "Alright. [04 turns a page to reveal two pages of hand-written text with some hand-drawn diagrams] And now more aspects of practice here? And what's happening on the next page [GL is referring to the second of these two pages]?"

04 "I think this is...when we talked about the reflective journal."

GL "Alright, okay, right... So I can see you're working in quite a visual way here, in that you are making diagrams, and... using arrows and... so there's something going here which is... quite visual and quite spatial in its own way, it's not a list, or it's not simply a list... Okay, keep going, and... [04 turns a page to reveal photographs of Dalston plus hand-written text and a 'Google'-type site plan]"

04 "This is when we went to Dalston... for the site visit, so this is what's happening. I did make... sketches of it [but brief interruption while GL talks to another person in the room]."

GL "...So how have we photographs, you took them?"

04 "Yes."

GL "We have text, which you wrote, which explains..."

04 "[04 is flicking through her big sketchbook] I'm trying to look for... when we visited the space, we had... to make like... sketches and... mappings. I... had like another little sketchbook with me... I then drew on that... but I don't have them stuck on here [04 turns a page to reveal more photographs of Dalston plus hand-written text]."

GL "And when... did you start producing the sketches in this [GL is referring to the other sketchbook mentioned by 04 above]...?"

04 "This one was after this..."

GL "After this."

04 "Yes."

GL "[04 turns a page to reveal more photographs of Dalston plus hand-written text] And so how far were we into the project by now? A few days or longer?"

04 "... Definitely..."

GL "More than a week?"

04 "No, more."

GL "Right..."
“At least three weeks.”

GL: "Okay, at least three weeks. And...mostly your work is textual or photographic or diagrammatic, and that's interesting to me."

04: "Over here...I did make sketches, but they were more just like what I saw. It wasn't like..."

[There is some intrusive background noise on the tape here. 04 turns a page to reveal more photographs of Dalston.]

GL: "04 turns a page to reveal more photographs of Dalston.] Okay, now these photographs, what is their purpose in your sketchbook here? Why have you got them here?"

04: "No."

GL: "Right. Okay, that's very interesting."

04: "[04 turns a page to reveal more photographs of Dalston.] Okay, now these photographs, what is their purpose in your sketchbook here? Why have you got them here?"

04: "[04 turns several pages in her big sketchbook showing photographs of interior and exterior spaces.]

GL: "And...did you return to these pages later on, did you look at them again, did you find them useful or was it kind of an event in time and you moved on?"

04: "I think...it was very useful because...I think this was probably the only project in which I really paid a lot of attention to the context...I mean, I really did go back a lot of times and saw what...Dalston is all about...[And she did a lot of like research on it so...] it informed my project in a way that it was very, that was one of the things I got in the critique, that it was a very informed and it was very relevant to the, it did take care of the context...So I think that it helped, all of this exercise."

GL: "So this was a useful exercise, they're your photographs, and...were there any photographs in particular that helped you and you kept going back to them, or...?"

04: "These are, this is basically not even the actual site, this is just a ["the"? area in general...]."

GL: "...Alright. Okay. And you did this because you were asked to? Or because you chose to?"

04: "...We were asked to do our site specifically and generally just understanding what the space was like...but...just did them because some of them had like really interesting features...specially this area I remember [04 points to a photograph]."

GL: "And...were you aware of how other people were approaching the project? Or was it very much that this was what you were doing and you didn't really know what anyone else was doing?"

04: "I think, when, specially when you...visit, then...these...sites, with your...peers, specially...your friends are with you, so...it does, like affect...you get an idea from them. Oh, yeah, they're doing that or, they probably might get an idea from me, because it's, it is, I won't say that it's just me working like that."

GL: "And...how did you feel the project was going at this point? Did you feel you were prepared by what they probably might get an idea from me, because it's...I won't say that it's just me working like that."

04: "I think...basically...[04 returns to preceding pages] they're of the spaces that we visited, and, it's for my own...understanding and my own, like, I have annotated what I like about them...and the features that were interesting..."

GL: "Okay, okay, yes, keep going.

04: "[04 turns several pages in her big sketchbook showing photographs of interior and exterior spaces and interventions] They're just pictures..."

GL: "More photographs and then the text added to them runs out. [04 turns to a page of handwritten text in her big sketchbook] And now, 'Sound and Acoustics in Buildings...'."

04: "This is when I started thinking of what to do, with the site..."

GL: "Okay. And we're still not up to the first sketches there, are we?"

04: "No."

GL: "Okay, at least three weeks. And...mostly your work is textual or photographic or diagrammatic, and that's interesting to me."

04: "Over here...I did make sketches, but they were more just like what I saw. It wasn't like..."
04 "[04 turns a page in her big sketchbook to reveal four bold hand-drawn perspective sketches with some annotation, each sketch surrounded by either a box or an ellipse]. ... This is... for the career... appraisal, and this is our first, I remember for our first tutorial... first... session with that tutor of what we've thought of the career appraisal, so this is the... initial idea of the storyboard.*

GL "Alright, a storyboard for the design project or for you as a... to explain you as a career?"

04 "...To explain me. [And...] started off like this but then I translated this into words, which is..."

GL "Did you... where you asked to do a storyboard?"

04 "No."

GL "No. You chose to do a storyboard [Why did you do that]?"

04 "...Because... it's... for the self appraisal bit of it... we were... asked to like think, and how we want to represent ourselves... and what do we want the one who's reading or who looks at... the CV or the self appraisal, what do they get of you? So I thought this was a good medium because I'm interested in... storyboards and comic strips."

GL "Are you?"

04 "Yes... I thought, maybe..."

GL "... Why are you interested in those, if I may ask?"

04 "Because it, it's a... I would still prefer doing this [GL thinks she means the storyboard approach here], but I didn't know how to present it on the self appraisal because... everything that I'm doing, it's just condensed in one... visual. I don't know if anybody gets this but this is the entrance of, so this was when I came to the University and that's where I wanted to start the journey."

GL "Right."

04 "So instead of me trying to explain my feelings which is, again, I'm not very good at words, so I thought it... must be easier, it is easier."

GL "... It is easier to draw but then you said you went back to words later."

04 "Because... this is a thing I... feel that my skills are not very... like... when I look at it now [04 points to one of her storyboard sketches], I don't think that it's a very successful... image in a way that nobody would understand what I'm trying to say..."

GL "Okay, and you felt you didn't want to try and improve the drawing?"

04 "... Also, because I didn't know how to lay it out... in a way, in a format... if I give it to somebody, would they understand what I'm trying to say, I didn't want to take the risk."

GL "... And you're using drawings here to... explain, although you don't feel it's going as well as you'd like, not to help yourself understand, am I... correct? Or did you learn about yourself by doing this?"

Up to: time left 13.10

04 "I think it worked as a diagram later [04 points to one of the storyboard sketches], the words that I was... instead of like making wordy diagram, I knew that this was one check box, this was another thing that I had to write about and this was another..."

GL "Now, keep going 'cos we will run out of time soon [04 turns a page in her big sketchbook to reveal a number of exploratory freehand perspective sketches of three-dimensional forms accompanied by hand-written annotation], this is for the..."

04 "This was just... again from the [04 turns a page in her big sketchbook to reveal a number of exploratory freehand perspective sketches of three-dimensional forms accompanied by hand-written annotation], this is for the..."

GL "Is this for what was called the Quick-Fire project...?"

04 "Yes."
GL: "...that I've heard about. Yes, so the Quick-Fire project, so now, you came to the Quick-Fire project, it seems, not having done much design work in terms of generating forms, producing drawings [04 is leafing through her small sketchbook whilst GL is talking]. Am...I correct in that?"

04: "I'm...sorry, say that again please."

GL: "It seems as if at this point, until you got to the Quick-Fire project [04 continues leafing through her small sketchbook whilst GL is talking] you hadn't produced very many drawings or much design work as such, you'd been doing research..."

04: "Yes [04 appears to be listening again]."

GL: "...thinking about things and various tasks. So suddenly you have a design project...What was the Quick-Fire project all about?"

04: "...It was about...designing a piece of furniture...to introduce in our space [there is quite a lot of potentially distracting background noise here], but...yeah, and which was supposed to be in a way a part of the...space in a way that it couldn't...it's not...it couldn't be moved or..."

GL: "The brief is here. And you are immediately drawing."

04: "Yes."

GL: "...What's going on?"

04: "I think just...thinking of what...in terms of what [04 points to one of the hand-drawn perspective sketches] one would visually see, seeing it's that and then I'm breaking it down to what each...you know like part of the...structure would work, so this is a [inaudible because of the background noise] lower part with [inaudible because of the background noise – 04 seems to be waiting for silence] central objects and organic forms grew out of it [04 points to another hand-drawn perspective sketch]. So this is somebody sitting over here and looking onto it and then this [inaudible]."

GL: "So what were you using the drawings for at this point. They're three-dimensional drawings in almost every case, I think, aren't they? They're perspective views, perhaps except this one [GL points to one sketch that might show a plan or section view] we have, or maybe exploded isometric views, perspective views here."

04: "I think just...exploring ideas...and we didn't go with any one of these."

GL: "Right. Now were you producing these drawings to tell yourself about things that you didn't understand?"

04: "Yes [very faint]."

GL: "Were you also producing them to tell other people? This was a group project?"

04: "Not yet...I don't think anybody would understand these [04 points to some of her hand-drawn perspective sketches]...These were just for myself."

GL: "And did they help you?"

04: "I think they did because things that I saw, like, I thought that this would work out [04 points to one of her hand-drawn perspective sketches] and I started drawing it and I said, No, maybe how would I turn this in terms of material...and, over here, this was a problem [04 points to another of her hand-drawn perspective sketches], this was...an arrangement of three...tables and I was...thinking of how would I arrange them, and then..."

GL: "Okay. So you didn't brainstorm, to begin with? You simply drew shapes explaining junctions, interaction between a person and an object...and how long did this take you?"

04: "I think it, sketching wasn't, wouldn't even take like a second I think...but it's just like whatever I thought of and then I tried to make it. Very quick sketches...[04 turns a page in her big sketchbook to reveal a series of layered, hand-drawn views (possibly perspectives) of organic-type forms on tracing paper, plus an array of hand-drawn plan views that show different possibilities for the same space]. And then I thought of what...started tracing off like some organic forms, trying to see what I could extract from them."
GL “And why did you do that…?”

Up to: time left 08.39

GL “...Why did you choose organic forms?”

04 “...I don’t remember, really, what we were thinking.”

GL “It might have been from the group, maybe... or from you? And we have a small amount of, which is again not a criticism, of sketching here; you tracing over somebody else’s form that you found [GL points to the layered sketches]...on the internet. [And, you don’t do very much of that, perhaps, before moving onto a different kind of approach. Did this tell you something useful or...?”

04 “I think the thing is that I wanted, I don’t remember why I wanted to have like an organic... I wanted to have an continuous thing that becomes furniture at points and then, then it becomes into something that holds lights and then it just... a continuous thing that doesn’t break anywhere. So it was this [04 turns back to a previous page and points to a perspective sketch]... first... it was this at first and then [04 turns back to the most current page]... it was... then I thought of, because I couldn’t, I couldn’t visualize how this is going to work out, so I took out like an image and I tried to make, like, you know, these are...[04 points to a detailed part of one of the layered sketches] setting areas... and curves where you could sit... and then I tried to put that into the plans and see if that would work.”

GL “And this was for you again, or is it for communicating with other people in the group?”

04 “No, this for me.”

Up to: time left 07.01

GL “For you. In your own time?”

04 “...Yes, when I was trying to think of the... design.”

GL “[GL points to the array of plans] And suddenly we move from an object, or a series of objects, to something within a context; within a cafe. You have a series of plans of the same space, I think, and you are placing organic forms within that in plan. Why did you choose to be working in plan, do you remember?”

04 “I think it was more about first... for my own understanding of what I want to be where... like just like an arrangement of the things... and then what they would look like I would obviously work into sections.”

GL “Right, okay, okay, thank you. And then over the page. [04 turns the page in her big sketchbook to reveal some hand-written notes plus two bold perspective sketches of tusk-like forms] And you are... someone who has shown in this work quite a lot of words. But here you’re not using words.”

[There is a lot of background noise now: a discussion, bordering on an argument, between two academics in the same space as the location for this interview.]

04 “I think because... even with the other projects I would come down to, I think, sketching my ideas, but, when I have a lot of time I... tend to start off with reading and then trying to write what I have to do or what I should do or what I should look at, and then I go on to drawing a little... and the just the final thing.”

GL “Okay.”

04 “[04 turns the page in her big sketchbook to reveal some hand-written notes and some photocopied/downloaded material (mostly text but with two perspective images)] This is just...”

[There is a lot of background noise now – the argument might have caused 04 to feel tense – it certainly caused GL to feel tense.]

GL “So now, continuing on the Quick-Fire project...?”

04 “I think Quick-Fire is done by now.”

GL “It’s done by now. So there’s nothing beyond these drawings [GL turns back to the previous perspective sketches in the big sketchbook], of the Quick-Fire? And why... is that, where... did the Quick-Fire project go next, was that in somebody else’s work?"
GL “Okay. Right. And we’re not using the small sketchbook here?”

04 “No.”

[The background noise continues.]

GL “Okay. Right. And we’re not using the small sketchbook here?”

04 “No.”

[04 spends some time leafing through the small sketchbook whilst the argument continues nearby. It was generally not clear to GL why she referred to the small sketchbook during this interview as she said little about its contents.]

04 “[04 points to the photocopied/downloaded material visible in the big sketchbook] And this is… just an article that I was looking at for the sound acoustics… [04 turns a page to reveal two hand-drawn detail sections, but puts these away swiftly] that’s [?] later…”

[04 turns a page in her big sketchbook to reveal a number of hand-drawn, annotated plan views, each given a rectangular border.]

GL “Okay, right… What we have is a series of thumbnail drawings [GL points to the sketch plan drawings]… but what you are showing is like a storyboard, isn’t it, really… of a sort? Each one placed within a rectangle. Why in a rectangle, here, what’s going on?”

04 “I think this was a series of thumbnail drawings… where I was trying to see how to, this was just the very beginning of the space and [04 points to a hand-drawn plan], the very first bit of… where I wanted what to be… Because by now I had an idea what I wanted, I wanted to have a wall… which could be painted so… I think this was how I came onto it, that where I want to place it.”

Up to: time left 03:26

GL “So where did that idea for a wall come from?”

04 “Because I wanted… the idea of the wall came from again what East London is all about, and Dalston is all about, the amount of graffiti that I saw over there while walking the streets, I thought that, you know, there are a lot of graffiti artists, and people like to paint… on walls, so this was a wall that I gave the… and, a space where people could come and just paint on and make a mural.”

GL “Okay, right. …What we have is a series of thumbnail drawings [GL points to the sketch plan drawings]… but what you are showing is like a storyboard, isn’t it, really… of a sort? Each one placed within a rectangle. Why in a rectangle, here, what’s going on?”

04 “…I think I, when I draw a thing I felt… that I don’t… like a lot of space… in a way that if I know that there’s, I want to draw… if I have like a smaller, if I have give a boundary to my drawing, then it’s easier for me to draw within.”

GL “Right, okay. So these are seen as different drawings of… developing the idea, is that what you’re doing here?”

04 “Yes.”

GL “Always as a plan in this case?”

04 “Yes, because at first I want to see what the arrangement of it should be in the space.”

GL “Okay, right. Okay. And… why did you decide to work in this way, because somebody had told you, or you felt at this point you’d visited the site, you’d done the research, you were ready to start drawing these floor plans?”

04 “I think it’s just how I… draw, I think that’s how, when I want to, when I think of what I want to do, that’s how I go. Well, it’s not, on the very early stage it’s like somewhat in the middle.”

GL “[04 turns a page to reveal hand-drawn sketch plans] Okay. So what’s going on here then?”
[The background noise is quite intrusive now.]

04 [I think it’s again just a…there is a bit in my space [04 points to one of the hand-drawn plans] where I want it have like a…like levels…as furniture…It means levels that you could sit on…you could like…so this me trying to calculate how high it should be…]

GL “Right. Now I’m interested that, when you were looking at the Quick-Fire ideas, they were three-dimensional, but here, what you’re showing is very much about the plan."

04 “…It’s I think because… I feel that my perspective drawing is not very strong."

GL “Mmm… Strong…"

[The recording ends at this point.]

[End of recording clip-2013-02-06 12;19;53-03]
Appendix E – Transcript of video-recording of respondent 07’s interview including categories, sub-categories applied and memos written by the researcher – sample

This is included to illustrate how the researcher documented the following in written form: verbal and non-verbal interactions between the respondent, the researcher and the sketchbook material; and the content of the sketchbook material.

University of Bedfordshire
Institute for Research in Education (IReD)

RESPONDENT 07 TRANSCRIPT 36.27 DURATION
11/02/14
Transcribing commenced Tuesday 14/02/14 and completed Friday 28/03/14
Starts at: 00.00.00

Memos
Initial note: 07 presents quite a rich and complex picture here, referring to images from more than one sketchbook almost simultaneously.

Start of the ‘Retail Space Project’

1. [07 begins by opening a small (A4) lined notebook to reveal 1 page of small, diagrammatic (ie: thumbnail) exploratory paper-based freehand sketches – 1 perspective/isometric, and 11-12 sketches showing variations of a staggered, almost herringbone pattern of lines (maybe plans, maybe elevations, maybe the respondent is not sure yet) – plus 1 page of hand-written text including “Eisenman quotes that it is ‘Right to conquer pure function…’”, “…for example, a typical/conventional wall would be used to block a way…”, “…referring back to a deconstructivist style I have implemented the idea of depicting a wall wrongly…” and “…inspired by tree branches….”] I think this is quite an impressive start to the interview. On these pages there are plenty of small paper-based freehand diagrammatic sketches showing small, incremental changes, and hand-written notes that together address a number of issues: layout “…a typical/conventional wall would be used to block a way…”, metaphor “…inspired by tree branches…” and concept “…a deconstructivist style…”. Also, the incremental nature of the exploratory diagrams – 11-12 of them, “…maybe plans, maybe elevations, maybe the respondent is not sure yet”, suggest to me that the respondent already has a clear-ish idea of which direction to go in for now, a clear-ish grasp of the way to use paper-based freehand sketches for design ideation and a willingness to think iteratively. These pages suggest that the respondent was clear and motivated. What Sub-Categories should I apply? I suggest [33] Produces and uses paper-based freehand sketch diagrams to ask (and attempt to answer) questions about space planning concerning his/her design proposals in response to a spatial design matter, [4] Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter but not [6] Produces and uses paper-based freehand perspective sketches to ask (and attempt to answer) questions about his/her design proposals because the perspective/isometric is quite rudimentary and lacks evidence of scale or detail. I know some of the diagrams may (or may not) be plans or elevations, but I think it may not be worthwhile distinguishing between these here because they aren’t clearly plan or
elevation drawings but more difficult-to-define gestures. Is the hand-written text connected to the diagrams, or just next to them? The following statement suggests a clear link because the diagrams show what could be termed branch-like patterns, suggesting that the text may have been addressing a similar agenda: "...but returning back to a deconstructivist style, I have implemented the idea of depicting a wall wrongly by shaping a framed structure, revealing tree-like patterns, inspired by tree branches." This links 07's sketches to Peter Eisenman and thus to non-visuo-spatial research carried out by 07.

The text "Eisenman quotes that it is 'Right to conquer pure function…'" suggests a case of [9] Carries out supporting visual pictorial visuo-spatial research in support of connection with design ideation or [45] Carries out non-pictorial visuo-spatial research (eg: textual, auditory, interview based…) in support of connection with design ideation. From the evidence it is hard to certain about which, but 07's references to Eisenman as showcased during this interview usually summarise and discuss Eisenman’s theories rather than show his buildings look like, so I am inclined to see this research as [45] Carries out non-pictorial visuo-spatial research (eg: textual, auditory, interview based…) in support of connection with design ideation.

07 "For my…design proposal…mine was...the Retail Space. The reason why I chose that because I wanted to...do a design that involves everyone from this University...So for the early stages I did quick sketches [07 points to the thumbnail sketches mentioned above then turns back 2 pages to reveal 2 pages of more detailed paper-based freehand sketches showing possible spatial interventions. Some of these are very small – 5-6 thumbnail diagrams that I cannot understand; most are perspective views initially showing people seated on furniture and what may be retail display units, then 1 perspective view of a three-legged structural system, then 2 perspective views showing quite a sophisticated display system (including the word “Rotate”), then 2 perspective views showing a proposed structure interacting with the existing structure; the annotation includes phrases such as: "Seating area", "Pillars/Beams", "Materials?? concrete/steel/wood…” and "Peter Eisenman"...These were my early sketches, these were just...quick ideas of how I can...implement this into my design." These early paper-based freehand sketches and annotations contain some interesting data, I think. The phrase “…2 pages of more detailed paper-based freehand sketches showing possible spatial interventions. Some of these are very small – 5-6 thumbnail diagrams that I cannot understand; most are perspective views initially showing people seated on furniture and what may be retail display units, then 1 perspective view of a three-legged structural system, then 2 perspective views showing quite a sophisticated display system (including the word “Rotate”), then 2 perspective views showing a proposed structure interacting with the existing structure; the annotation includes phrases such as: “Seating area”, “Pillars/Beams”, “Materials?? concrete/steel/wood…” and “Peter Eisenman” suggests [33] Produces and uses paper-based freehand sketch diagrams to ask (and attempt to answer) questions about space planning concerning his/her design proposals in response to a spatial design matter, [6] Produces and uses paper-based freehand perspective sketches to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter and [4] Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter. How can I tell whether these ideation moves are connected, rather than just sharing the same page but produced for unconnected reasons, perhaps at different times? Well, there are sketches of seating, accompanied by the hand-written words “Seating area?”; there is an arrow linking another sketch of seating and a display unit with the words “Pick out stationary”, two more arrows linking this same sketch with the words “seating area” and another arrow linking these words with a sketch entitled “Rotate?”; there is another sketch also next to the word “Rotate”; there are what may be diagrammatic section sketches through different materials next to the hand-written words “Materials?? concrete/steel/wood…”: Although some of the items of hand-written text and some of the sketches do not appear to have clear links with each other or with the other items on the pages, there is a general sense of the respondent sketching at different scales, both three-dimensional and two-dimensional, and writing text, both descriptive and questioning. All this adds up to what I regard as a well-connected, multi-tool approach, at or very near the start of this project. It is perhaps worth noting that at this early stage the respondent moved quickly from thumbnail diagrams to quite detailed perspective sketches and written thoughts about function, structure, materials, design theory.
The moves 07 points to the thumbnail sketches mentioned above then turns back 2 pages to reveal 2 pages of more detailed paper-based freehand sketches showing possible spatial interventions... prompts a question: what made 07 choose to point to these sketches and then turn the page? Let us take the first of these moves: the pointing. Talking about a set of sketches 07 says, "...for the early stages I did quick sketches..." and points to these. Perhaps he wanted to emphasise that these were the sketches he meant? Perhaps he felt nervous and wanted to do something with his hands to release the tension? Perhaps he wanted to lead the interview by directing my attention to things he wanted me to look at? I do not know. I do feel, though, that this is a case of: Sub-Category: [69] Respondent points to a page or an item on a page without apparent encouragement from the interviewer.

And what about the page turning? Perhaps 07 was aware that he had not started at the beginning of the project as documented in the sketchbook? Perhaps he thought that I was interested in looking at more of his sketches (I had indicated in my introductory briefing that I was wanted to see how students had used sketches to develop their design ideas) and so he wanted to make sure that I saw as many examples as possible? Perhaps he thought this page of sketches was not very impressive and wanted to show me ones he thought I'd think were better. Again, I do not know. I do feel, though, that this is a case of: Sub -Category: [68] Respondent turns a page without apparent encouragement from the interviewer.

2. GL “Did you have a site…?”

07 "...My site was at the seventh floor...in this building...These were my...early designs..." 07 turns a page to reveal 1 larger paper-based freehand perspective sketch showing a possible façade treatment; with shading and images of people, plus hand annotation: "Colour Scheme: Black and White", "Glass? Frosted? Acrylic? Coloured?", "Wood? Varnished? Glossed...?" and ""Tree branch Inspired!"; followed by 1 paper-based freehand plan sketch showing the pattern of structural elements in some detail, plus hand-annotation "Counter", "Fashion/Product Design/Architecture/Media", and "Using MDF/Easily Manufactured/Cost Efficient..."... For the above I suggest [6] Produces and uses paper-based freehand perspective sketches to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter, [4] Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter and [31] Produces and uses paper-based freehand plan sketches to ask (and attempt to answer) questions about space planning concerning his/her design proposals in response to a pre-existing spatial design speculation matter. It is again perhaps worth noting that at this early stage the respondent has moved quickly from thumbnail diagrams to even more detailed perspective sketches and written thoughts about function, structure, materials, colour – important clues on Dimensions.

The move 07 turns a page to reveal a larger paper-based freehand perspective sketch showing a possible façade treatment... prompts the question: what made 07 choose to turn the page? In response to my question, 07 stated, "...My site was at the seventh floor...in this building..." but then did not discuss the site before turning the page just after "These were my...early designs..." I get a sense from this that 07 was trying to set the pace here, not answering my question about the site in much detail, but showing me what he wanted me to see, for reasons I am not clear about. This is a case of: Sub-Category: [68] Respondent turns a page without apparent encouragement from the interviewer.

How do I know that the paper-based freehand perspective sketch, paper-based freehand plan sketch and hand-written text were produced and used in conjunction with each other rather than placed on the same page but for unconnected reasons and/or even at different times. Well, "Tree branch Inspired!" is written next to a façade treatment that appears to resemble the tree branch inspired sketches showcased at the start of the interview; "light" and "entrance" are linked to the same façade treatment by arrows; the phrase "outer wall idea" appears to be a title to the perspective sketch. The lists of materials may not be linked directly to the perspective sketch but seem to address the same agenda and may evidence 07 asking: “what does it look like and what is it made out of?” There are also materials listed next to the sketch plan. However, other than that the plan shows ideas for the same space and
appears to have been drawn with the same pen, there is no clear evidence that 07 produced it as part of a suite of interconnected ideation moves.

3. GL “Is this like day one of the project?”

07 “…Yeah, these were part of the project…Our area was pretty small so I had to make sure…it would fit the vicinity…so therefore I thought of…making it into a rectangular shape, and for these ones here [07 points to the perspective view mentioned above, and then turns the sketchbook so that GL can see the page better] these are just basically…the façade. I base my…design on Peter Eisenman.”

GL “I noticed…he was mentioned…on the previous page…[GL turns back to the two pages of slightly more detailed paper-based freehand sketches mentioned above] So, is this your first page of sketches here?”

07 “These were some of my first pages…[07 turns back some pages to reveal paper-based survey drawings produced quite sketchily but using straight-edges in the main: paper-based freehand section/wall elevation sketches with dimensions added by hand. These include: 6 sectional elevation drawings including hand-written dimensions and dimension lines, plus 1 rather mysterious diagram. There is also 1 word of hand-written text: "Total =" before some simple calculus]”

The moves 07 points to the perspective view mentioned above, and then turns the sketchbook so that GL can see the page better prompt the question: what made 07 choose to point and then reposition the sketchbook here? I do not know, but I get a sense not of a student in a hurry but rather of a student trying to be helpful, directing me through the sketchbook, making sure I can see it clearly and feeling that he was permitted to take the initiative here. The following is appropriate for the pointing, I think: Sub-Category: [69]

Respondent points to a page or an item on a page without apparent encouragement from the interviewer. But what about the moving of the actual sketchbook? This is, I think, another form of pointing: 07 was directing my vision to a particular place. I feel a new Sub-Category is therefore not needed here.

The survey drawings appear to comprise 6 sectional elevation drawings including hand-written dimensions and dimension lines, plus 1 rather mysterious diagram. There is also 1 word of hand-written text: "Total =" before some simple calculus. This material seems to be a case of [42] Produces and uses paper-based elevation drawings, hand-drawn using a straight edge, to explain dimensional information on characteristics of a spatial design speculation matter to him/herself or others in response to a pre-existing spatial design speculation matter, [33] Produces and uses paper-based freehand sketch diagrams to ask (and attempt to answer) questions about space planning concerning his/her design proposals in response to a spatial design matter and [4] Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter. Can I be sure that these three ideation moves were used in conjunction with each other? Well, all 6 sectional elevation drawings are hand-dimensional, as is the mysterious diagram; the calculus may relate to the hand-written dimensions although I cannot see clear evidence of this (but I think it likely).

The phrase “Our area was pretty small so I had to make sure…it would fit the vicinity…so therefore I thought of…making it into a rectangular shape…” is of some interest. To me it suggests a very pragmatic approach to the design challenge based on the survey carried out. The student has informed himself of at least one of the limitations of the site and is responding to that. But is he being overly cautious, limiting? His wish to “…base [his]…design
on Peter Eisenman” is arguably not overly cautious and limiting because it could allow him to introduce more challenging spaces and forms within a rectangular envelope.

Is the phrase “…just basically…the façade” evidence of [7] Appears to be using dismissive words and phrases to describe his/her paper-based freehand design development sketches design ideation tools? Why might someone use the words “just basically”? Why might I use those words? “Just” does not have to mean “merely” or “only”. It may be another word for “absolutely (as in “I’m just mad about Harry”) or “simply” (as in “He’s just not that into you”). I incline towards the latter: the respondent is saying that this drawing simply shows the façade and not other aspects of the design. And what about “basically”? This word can, in my experience, be used as a kind of verbal insert that does not add to the content of the speech. It can also be another way of saying “simply” (or, more accurately, “in essence”) – for example, “basically, we’re not seeing each other any more”. As “basically” and “just” may be slightly tautologous, I am not inclined to see them as being “dismissive words and phrases” here.

4. GL “…So you surveyed the space, and now you’re in and you’re working in perspective?”

[07 has turned pages in his A4 sketchbook to reveal 2 large paper-based freehand perspective views. The first of these is a black-and-white pen sketch of the ‘outside’ of the intervention, including people and the hand-written words “STRUCTURE: FRAME”, “They use a skeleton” and “Entrance” (the last of these linked by arrows to two places on the perspective), plus a thumbnail paper-based freehand diagrammatic plan sketch; the second is a hand-coloured sketch showing people standing in front of display units and casting shadows across the floor, plus the hand-written words “Lights up/Illuminates the room/apppealing at night time.”] I suggest [6] Produces and uses paper-based freehand perspective sketches to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter, and [4] Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter here (I feel disinclined to categorise the plan drawing as it appears to show practically nothing). These are quite developed perspective sketches of the design proposals when compared with the relatively recent thumbnails – the respondent appears to have moved with speed and confidence. Also, the words “STRUCTURE: FRAME”, “They use a skeleton”, “Entrance” and “Lights up/Illuminates the room/apppealing at night time” suggest relatively wide-ranging thinking: structure, function, environment and aesthetic.

How can I be sure that the text and perspectives above were connected and not just sharing the same pages whilst being unconnected? Well, the word “Entrance” is linked by arrows to two places on the first perspective, and the words “Lights up/Illuminates the room/apppealing at night time” appear to describe functions connected with the second perspective but not illustrated by it.

07 “Yeah…The reason why I chose Peter Eisenman, because, I really like his idea of…natural architecture…He says that everyone uses…technology way too much and…it doesn’t have that classical concept of architecture and it goes away from…using…paper…and…” This may be why this respondent agreed to speak to me: he is a fan of paper-based architecture. I should keep that in mind. Also, this comment seems to indicate: [45] Carries out non-pictorial visuo-spatial research (eg: textual, auditory, interview based...) in support of design ideation in that the respondent has done reading (this was evidenced in the interview). But I do not regard this as a new application of this Sub-Category but rather as more data to add to the previous application.

[07 has turned away to leaf through a pile of larger (A2) sheets.]

GL “Right, survey drawings coming up….”

[07 moves his sketchbook to one side and reveals, in fact, 1 isometric drawing showing his site. This drawing was produced using straight edges. The drawing is very clean and carefully drawn.]
07 "...This is an axonometric of my space."

GL "...Right, hand-drawn...with straight edges..."

07 "...Another one [07 reveals 1 large-scale (perhaps 1:20 or 1:10) wall elevation drawing showing his site which shows door handles, hinges, locks on lockers. This drawing is very clean and carefully drawn]."

GL "And...were you asked to produce this family of...orthographic and isometric drawings...?"

07 "Yeah, we were asked to do this just to...basically improve our skill in surveying...drawing...on paper...and just to practice our perspectives, our lines [07 reveals 1 more large-scale (perhaps 1:20 or 1:10) wall elevation drawing similar to the one above. He then reveals 1 large A2 perspective drawing hand-drawn using a straight-edge showing the site, quite a neat, clean drawing)...using the tools correctly and overall getting an idea...of how surveying works. This is just like circulation. [07 reveals 1 hand-drawn overlay showing pedestrian circulation routes shown in coloured fibre tipped pens on a dimensioned, hand-drawn with straight edge plan drawing] And then... the axonometric of the building which is unfinished...[07 reveals 1 neatly drawn exploded isometric – not axonometric – hand-drawn using a straight-edge, showing the building which looks similar to the one shown by the institution in its publicity material]...So my area's here [07 points to part of the drawing]."

GL "...So this is...helping you to understand the existing...context...for this...?"

07 "...Yes... What should I categorise here? These drawings describe an existing context, but they are not "paper-based freehand sketches" but rather "paper-based drawings hand-drawn using a straight edge", and they are scale drawings – thus they were created using – and therefore contain – dimensional information. Regarding the Sub-Category allocated earlier, [40] Produces and uses paper-based plan drawings, hand-drawn using a straight edge, to explain dimensional information on a spatial design speculation matter to him/herself or others in response to a pre-existing spatial design speculation matter, I had modified it from [40] Produces and uses paper-based plan drawings, hand-drawn using a straight edge, to explain dimensional information on a spatial design speculation matter to him/herself or others because I had already argued that I cannot be sure whether drawings were produced to "explain" to "him/herself or others" or to "ask questions" about design proposals: these two tasks may have areas of overlap. Also, I had omitted the reference to "dimensional information" because I saw little value in having two Sub-Categories, one that concerned straight edge-based drawings produced to provide "dimensional information" and one that concerned straight edge-based drawings produced without a desire to provide "dimensional information". In fact, almost all of the plan drawings produced with straight edges I have seen during these interviews have arguably concerned "dimensional information", if only because they could not have been drawn without considering "dimensional information". Thus: [43] Produces and uses paper-based isometric drawings, hand-drawn using a straight edge, to explain dimensional information on characteristics of a spatial design speculation matter to him/herself or others becomes [43] Produces and uses paper-based isometric drawings, hand-drawn using a straight edge, to explain dimensional information on characteristics of a spatial design speculation matter to him/herself or others; [42] Produces and uses paper-based elevation drawings, hand-drawn using a straight edge, to explain dimensional information on characteristics of a spatial design speculation matter to him/herself or others becomes [42] Produces and uses paper-based elevation drawings, hand-drawn using a straight edge, to explain dimensional information on characteristics of a spatial design speculation matter to him/herself or others; and [41] Produces and uses paper-based perspective drawings, hand-drawn using a straight edge, to explain information on characteristics of a spatial design speculation matter to him/herself or others becomes [41] Produces and uses paper-based perspective drawings, hand-drawn using a straight edge, to explain information on characteristics of a spatial design speculation matter to him/herself or others in response to a pre-existing spatial design speculation matter; and [41] Produces and uses paper-based perspective drawings, hand-drawn using a straight edge, to explain information on characteristics of a spatial design speculation matter to him/herself or others in response to a pre-existing spatial design speculation matter. There is also [33]..."
Produces and uses paper-based freehand sketch diagrams to ask (and attempt to answer) questions about space planning concerning his/her design proposals in response to a spatial design matter and [40] Produces and uses paper-based plan drawings, hand-drawn using a straight edge, to explain dimensional information on a spatial design speculation matter to him/herself or others in response to a pre-existing spatial design speculation matter.

How do I know that these drawings were produced in conjunction with each other? Well, most of them represent what I would regard as a suite of drawings showing, to scale (or, at least, in proportion): isometric, elevational, plan and perspective views. Even the diagram was drawn over a plan to scale. Also, the drawings may have been tabled in response to me saying, “…So you surveyed the space…” Although he shares some thoughts about Peter Eisenman, 07 then turns to leaf through a pile of larger (A2) sheets which he had placed on the floor, at which point I said, “…survey drawings coming up…” Also, 07 tabled all these drawings one after the other, to my eyes as a suite of connected drawings.

It would appear that these drawings were produced in response to internal influence, indicating [29] Is being guided by previous educational experiences internal educational experiences: 07 “Yeah, we were asked to do this just to…basically improve our skill in surveying…drawing…on paper…and just to practice our perspectives, our lines…using the tools correctly and overall getting an idea…of how surveying works.” Note also: [21] Produces and uses paper-based freehand plan sketches may be used to explain the characteristics of a spatial design speculation matter to him/herself or others (a dimensioned, hand-drawn with straight-edge plan drawing).

[07 turns away to search for more drawings on the floor, and mentions “AutoCad” while doing so.]

GL “You went onto AutoCad soon after…producing these exploded drawings?”

07 “…No…I was still doing my…”

[07 turns away to search again and asks GL if he would like him to show his other drafts. GL affirms.]

07’s mention of Autocad was not accompanied by the tabling of any CAD work here or by 07 providing any detail about what had done, when or why, so I am choosing not sub-categorise this rather vague statement yet. However, there appears to be much to comment on here concerning the moves 07 makes above, which appear to indicate someone who feels very much ‘in the driving seat’: 07 has turned pages in his A4 sketchbook to reveal two large paper-based freehand perspective views…07 has turned away to leaf through a pile of larger (A2) sheets…07 moves his sketchbook to one side and reveals, in fact, 1 isometric drawing showing his site….07 reveals a large-scale (perhaps 1:20 or 1:10) wall elevation drawing…07 reveals another large-scale (perhaps 1:20 or 1:10) wall elevation drawing…He then reveals a large A2 perspective drawing…07 reveals a hand-drawn overlay showing pedestrian circulation routes…07 reveals a neatly drawn exploded isometric…07 turns away to search for more drawings on the floor…07 turns away to search for more drawings on the floor. What do I mean by ‘in the driving seat’? Well, I mean he seems to be making the decisions about what I will look at, when I will look at it and for how long. He seems to be choosing items from different sources (a sketchbook, a pile of work on the floor). He is not waiting for me to say, “Can you turn the page, please?” I wonder why he might have been like this? He seemed to me to be a very quiet, polite young man, but these moves suggest someone who felt he was in control of the event, and knew quite clearly what he wanted me to see and hear – and in what sequence. Why else might he have made these moves? Perhaps he was eager about his work and wanted me to see as much of it as he could show me? Perhaps he wanted me to not spend too long looking at the preceding work? I do not know, but I think these moves are a clear case of: Sub-Category: [68] Respondent turns a page without apparent encouragement from the interviewer.
The move 07 points to part of the drawing… prompts the question: what made 07 choose to point here? However, this does not, to me, seem to be a significant move. 07 said immediately beforehand, whilst pointing to an axonometric view of the entire building, “So my area’s here.” He had just been showing various survey drawings, and this drawing did not reveal where his site was. Thus, it seems to me that 07 was pointing because he wanted to draw my attention to a particular matter that was central to the current discussion, not because he wanted to steer the conversation in a certain way by selecting one sketch (or part thereof) rather than another.

5. 07 “So…after surveying the area, we had to do our measurements, and this…was my first…design concept…” [07 tables 1 wall elevation/section drawing produced by hand using straight-edges: quite a neat, carefully-produced drawing showing a complex system of structural members.] This is interesting because the drawing is carefully drawn and quite detailed – not a quick freehand concept sketch but an elevation/section hand-drawn to scale using a straight edge. I regard this as a drawing that was intended to explore or explain the layout of the retail unit ‘external’ wall, thus: [42] Produces and uses paper-based elevation drawings, hand-drawn using a straight edge, to explain dimensional information on characteristics of a spatial design speculation matter to him/herself or others in response to a pre-existing spatial design speculation matter. The later move (see below) 07 tables the “booklet”, showing, again, the large paper-based black-and white freehand perspective sketch and the hand-coloured freehand perspective sketch (see above), the first of which appears to be an earlier version of the wall elevation/section drawing also in view is interesting. It suggests that the wall elevation 07 has just tabled is connected to the large paper-based black-and white freehand perspective sketch shown in that booklet. It also suggests that 07 is aware of that link and is attempting to show it to me.

07 “…I don’t know what was the…building called but it was by Peter Eisenman, and it was of a kitchen…and… the area consists of…beams like trees coming down…and I was inspired by that.” The respondent appears to be mentioning research here, research into the designs of Peter Eisenman. This is interesting inasmuch as few – if any – of my Level 4 students would, I think, have been likely to mention such an inspiration. But was this respondent directed to Eisenman’s work? I think we’ll find that he was. But should I comment more on this? The respondent does not seem to know a lot about the building – “…I don’t know what was the…building called but it was by Peter Eisenman, and it was of a kitchen…” – and does not seem to have a very sophisticated grasp of it – “…the area consists of…beams like trees coming down…” So perhaps this is an example of research having been carried out, but not very in-depth and not showing much understanding (although the earlier discussion about “natural architecture” suggests more understanding than might be expected of my students). This seems like a case of: [9] Carries out supporting visual pictorial visuo-spatial research in support of design ideation. I wonder if I should categorise as [13] Mentions making exciting design discoveries experiencing a design surprise insight through his/her ideation activities design speculations 07’s statement, “…I was inspired by that.” Perhaps. He seems to have found something in the Eisenman building – “…beams like trees coming down…” – and this may not have happened – it was not guaranteed that 07 would be inspired by Eisenman’s work, so it is arguable that his was a design insight: he had the insight that he could use some of the forms of Eisenman’s designs in his Retail Project.

GL “So how did you get…from those sketches in that small booklet there [07 tables the “booklet”, showing, again, the large paper-based black-and white freehand perspective sketch and the hand-coloured freehand perspective sketch (see above), the last of which appears to be an earlier version of the wall elevation/section drawing also in view] to being able to draw this plan we’re now looking at [07 moves the “booklet” to one side, providing a better view of the wall elevation/section drawing produced by hand using straight-edges, although GL calls it a plan]?”

The moves 07 tables a wall elevation/section drawing…07 tables the “booklet”… and 07 moves the “booklet” to one side… appear to indicate someone who feels very much ‘in the driving seat’. But this may not quite be the case. 07 tables the “booklet”… and 07 moves the “booklet” to one side… follow me saying, “So how did you get…from those sketches in that small booklet there…?” so these moves may have been made in response to that question.
That said, 07 appears to have made the move 07 tables a wall elevation/section drawing… without any prompting by me. Indeed, the earlier moves 07 turns away to search for more drawings on the floor, and mentions “AutoCad” while doing so and 07 turns away to search again and asks GL if he would like him to show his other drafts. GL affirms appear to show 07 very much taking the lead, deciding to show me these things, deciding when to do this and deciding why to do it. I regard this as a case of: Sub-Category: [68] Respondent turns a page without apparent encouragement from the interviewer. However, I also note that 07 asks GL if he would like him to show his other drafts. GL affirms. This may not, therefore, quite be 07 seeing himself as ‘in the driving seat’, as I have put it elsewhere, but it does indicate him leading the agenda – he offered me the choice of seeing or not seeing certain work, but he did not offer me other choices here.

[07 explains that the drawing “basically” shows the façade.] I wonder if this is a case of using dismissive language? I think not. I have made a mistake in saying “…this plan we’re now looking at…” because the drawing was not a plan drawing but an elevation drawing. I think 07 may have been gently explaining this to me.

6. 07 “’Cos what I wanted to do with my first idea [07 removes his A4 sketchbook from view, then turns to the page in it that contains an early freehand perspective sketch, already tabled, showing a human figure standing in a rotatable drum-like structure, complete with shading, then brings it back into view] was this circular thing going [07 moves the A4 sketchbook to one side and then points to a circular feature on the wall elevation/section drawing]…where people could just walk in and grab books…which was supposed to be…retail.”

I wonder if I need to sub-categorise the moves 07 removes his A4 sketchbook from view, then turns to the page in it that contains an early freehand perspective sketch, already tabled…then brings it back into view and 07 moves the A4 sketchbook to one side and then points to a circular feature on the wall elevation/section drawing? These moves follow 07 saying, “’Cos what I wanted to do with my first idea was this circular thing going…where people could just walk in and grab books…” This was not something I had asked him to discuss, and I can see and hear nothing in my behaviour that indicates that I was prompting 07 to make these moves, even if unintentionally. I regard most of this as a case of: Sub-Category: [68] Respondent turns a page without apparent encouragement from the interviewer, and, regarding 07…then points to a circular feature on the wall elevation/section drawing, [69] Respondent points to a page or an item on a page without apparent encouragement from the interviewer. What may have been prompting 07 to make these moves here? Regarding Sub-Category: [68] Respondent turns a page without apparent encouragement from the interviewer I note that, earlier, 07 asks GL if he would like him to show his other drafts. GL affirms. These more recent moves may well be in response to that affirmation and may not, therefore, quite be 07 seeing himself as ‘in the driving seat’, as I have put it elsewhere. However, they do indicate 07 leading the agenda – he offered me the choice of seeing or not seeing that work, but he did not offer me other choices here. Regarding [69] Respondent points to a page or an item on a page without apparent encouragement from the interviewer he seems to have been identifying a clear link between the earlier sketch and the later drawing.

7. 07 turns away to find more drawings on the floor.]

07 “And my second idea was [07 spends some time off camera leafing through sheets of paper]…this…[07 tables a large scale (1:20, I think) dimensioned floor plan including dimension lines, hand-drawn with straight-edges, showing the external envelope and structure, plus an ‘island’ intervention]…which I developed by reading through…one of his [Peter Eisenman’s] books.”

This sounds like a case of [40] Produces and uses paper-based plan drawings, hand-drawn using a straight edge, to explain dimensional information on a spatial design speculation matter to him/herself or others in response to a pre-existing spatial design speculation matter. I regard this drawing as reasonably competent for a Level 4 student. What clues enable me to determine how connected this drawing is? Well, there is no clear evidence of a direct link between this plan and the preceding elevation, and we should note that this was 07’s
“...second idea...” However, 07 said he “…developed [his second idea, and this actual drawing] by reading through…one of his [Peter Eisenman’s] books.” 07 also discusses Peter Eisenman concerning his “first idea”. Thus, this drawing appears to be directly connected to research reading and connected via that to 07’s “first idea”: [45] Carries out non-pictorial visuo-spatial research (eg: textual, auditory, interview based…) in support of design ideation.

These moves are interesting: 07 turns away to find more drawings on the floor…07 spends some time off camera leafing though sheets of paper…07 tables a large scale (1:20, I think) dimensioned floor plan including dimension lines…I wonder what led 07 to make these moves? Having asked me earlier if I wanted him to show his other drafts, received my affirmation, and chosen to show me his “first idea”, he might well have thought he was responding to my request by showing me his “second idea”. But I have already noted that, in my judgement, he chose to give me that initial option. I also suspect he decided on the manner of showing me this item, going off camera and taking time to do it. Thus: Sub-Category: [68] Respondent turns a page without apparent encouragement from the interviewer.

8. [After a somewhat lengthy pause as he went off camera, and without being asked, 07 tables his laptop on which can be seen 2 digital plans, 1 digital section and 1 digital isometric view of the ‘island’ intervention being discussed. GL asks 07 to discuss this work.]

07 “…With the second idea, when I was reading through…his [ie: Peter Eisenman’s] work…he said that he had a lot of semiotics and symbols and meanings into his design…and in a way I kind of want to…implement that through the use of spaces. [07 takes his laptop away and begins to discuss the plan already tabled]…With this idea, I basically wanted to give the idea of…’cos it’s very…compact [07 gestures with both hands to the drawing], so I wanted to give the idea of education becoming really difficult obstacles…and you have to…go around and about…to find what you’re looking for. [07 points to the ‘island’ intervention]…I haven’t really designed it yet but…in this area here…it’s very complicated to get up to…there’s only one person that can go in here…and…as I got that, that’s when I had my final…design…”

07 shows 2 digital plans, 1 digital section and 1 digital isometric view of the ‘island’ intervention being discussed so it is right to sub-categorise these, but I note that 07 says nothing about them at this point, nor does he gesture to them. Thus: [24] [60] Uses CAD software to produce [69] Produces and uses plan drawings may be used to explain the characteristics of a spatial design speculation matter to him/herself or others in response to a spatial design matter, [24] [65] Uses CAD software to produce [34] Produces and uses section drawings may be used to explain the characteristics of a spatial design speculation matter to him/herself or others and [30] Uses CAD software to produce [39] Produces and uses computer-based 3D drawings may be used to explain the characteristics of a spatial design speculation matter to him/herself or others in response to a spatial design matter. To what extent are these drawings connected? Well, the laptop screen shows all 4 drawings, but they could all be different views of the same digital model. The plans resemble the hand-drawn large scale (1:20, I think) dimensioned floor plan including dimension lines, hand-drawn with straight-edges, showing the external envelope and structure, plus an ‘island’ intervention, as tabled most recently. However, as 07 tables but does not discuss these digital drawings, it is difficult to be sure how they are connected.

We should note: “I haven’t really designed it yet but…in this area here…it’s very complicated to get up to…there’s only one person that can go in here, and…as I got that, that’s when I had my final design…” which also suggests that 07 had a design insight here – thus: [13] Mentions making exciting design discoveries experiencing a design surprise through his/her ideation activities design speculations.

I wonder if the “basically” in “With this idea, I basically wanted to give the idea of…education becoming really difficult obstacles…” indicates a dismissive use of language? I think not. Why might 07 have used this word here? Why might he use it in this context? Why might I use it in this context? I think I would have been saying, "In essence, I wanted to give the idea
of...education becoming really difficult obstacles..." rather than "I was merely doing this." I suspect 07 may have been doing the same.

These moves appear to indicate someone who feels very much 'in the driving seat': without being asked, 07 tables his laptop on which can be seen 2 digital plans... and 07 takes his laptop away and begins to discuss the plan already tabled. What do I mean by 'in the driving seat' here? Well, 07 seems to have decided to table his laptop without any prompt – intentional or unintentional – from me, and then decided to remove it from view without any prompt – intentional or unintentional – from me; indeed, I asked him to discuss these drawings. I do not know why he made these moves. Perhaps he thought the laptop drawings would be of relevance to the discussion, or of interest to me, and then decided otherwise (even though I asked him to discuss them)? Perhaps he thought, having seen them, that the drawings were not good enough to show me, or he found he had little or nothing to say about them? Perhaps he just wanted me to glimpse them? Perhaps he decided to show me them again later, when he would explain and discuss them more? Whatever, I think these moves add up to: [68] Respondent turns a page without apparent encouragement from the interviewer. These moves also provide another indication of what I have termed elsewhere the 'dance' that takes place on occasions during some of these interviews: GL asks 07 to discuss the drawings 07 has tabled on his laptop, but 07 takes his laptop away without any discussion having taken place!

The moves 07 gestures with both hands to the drawing and 07 points to the 'island' intervention prompt the question why did 07 choose to gesture and point here? He seemed, in my judgement, to emphasising something he thought was important, on the drawing whilst explaining the design thinking. Thus: [69] Respondent points to a page or an item on a page without apparent encouragement from the interviewer.

9. [07 turns away to look for more drawings, and tables 1 neat, professional-looking plan drawing, probable scale 1:10, on tracing paper showing a different proposed layout, hand-drawn with straight-edges. He then removes that to show another drawing of a similar-looking scheme on opaque paper.]

07 "...So basically...I wanted to...go about the idea of education becoming a very...having a lot of obstacles...so...what I did was I separated...the retail side into four spaces [07 points to the four spaces on the plan]...this is basically like the fashion section, the architecture section, graphic design and that could be like something else...What I wanted to imply was that...in University people are so close together...but they don't really communicate with each other because they're so into their own course...That's why [07 points with two hands to the four spaces on the plan, then points to the partitions] they're so close to each other but yet these are walls that separate them..."

The above sounds like a case of [40] Produces and uses paper-based plan drawings, hand-drawn using a straight edge, to explain dimensional information on a spatial design speculation matter to him/herself or others in response to a pre-existing spatial design speculation matter. The drawings seem to me to be very competent: neat, clean, detailed, precise. The conceptual thinking seems impressive to me. What clues are there as to their connectedness? Well, the two drawings seem to be almost identical, except that one is on tracing paper and one on opaque paper, and were presented as one laid upon the other, suggesting that 07 sees them as connected to each other. Beyond that, it is difficult to tell from the data.

The moves 07 turns away to look for more drawings, and tables 1 neat, professional-looking plan drawing...He then removes that to show another drawing of a similar-looking scheme on opaque paper suggest a respondent who sees himself as in control of what is revealed, and when, during this interview. Having said earlier, "...that's when I had my final...design..." he appears to bring together the drawings that illustrate it for me, without asking me what I want to see, or whether I've looked at the previous drawings for long enough. There might, of course, be other reasons for 07 to be making these moves. He might be proud of the drawings (which are in my opinion very competent) and want me to see them; he might be in a hurry to end the interview, he might want me to stop looking at the earlier drawing; he might
want to arrive quickly at the "final...design" I do not know. But I regard this as appropriate: [68] Respondent turns a page without apparent encouragement from the interviewer.

10. "...And this is just a section that I did..." [07 tables 1 section, hand-drawn using straight-edges, showing dimensions, dimension lines and a cut-out human figure.]

GL "...Showing in section that design we've been looking at here?"

07 "Yeah..."

This sounds like a case of [66] Produces and uses paper-based section drawings, hand-drawn using a straight edge, to explain dimensional information on characteristics of in response to a spatial design speculation matter to himself or others (surprisingly, at 28/05/15, a new sub-category). The exchange, GL "...Showing in section that design we've been looking at here?" 07 "Yeah..." suggests that this section is connected with the preceding plan drawing: it shows the same proposal from a different viewpoint.

The move 07 tables 1 section, hand-drawn using straight-edges, showing dimensions, dimension lines and a cut-out human figure suggests, again, that 07 was setting the pace and agenda here: he seems to have decided to show me this drawing at this point and, interestingly, to say little about it except "...And this is just a section that I did..." and "Yeah..." I regard this as appropriate: [68] Respondent turns a page without apparent encouragement from the interviewer. But I wonder what 07 was trying to do here? Arguably, the drawing was part of his collection of design development images, and therefore relevant to our discussion, but the reason he showed me it so briefly and said so little about it is not clear.

11. 07 [After a somewhat lengthy pause 07 tables 1 sheet of tracing paper showing hand-drawn coloured lines (red) over the floor plan already tabled.] "This is just the circulation, I'm having a go at that..."

This sounds like a case of [33] Produces and uses paper-based freehand sketch diagrams to ask (and attempt to answer) questions about space planning concerning his/her design proposals in response to a spatial design matter. How do I know whether or not this sketch is connected? Well, having mentioned circulation around his proposed retail unit quite recently, he now shows a diagram plotting the circulation routes. Also, he shows this diagram over a floor plan already tabled, so it seems likely that this diagram is linked to that.

I wonder if the "just" in "This is just the circulation, I'm having a go at that..." indicates dismissive use of language? I think it might do. Although he might be saying something else, I suspect 07 is saying, "This page of loosely drawn red felt pen lines is merely (or only) a diagram showing circulation routes within the space, it's not as good as other drawings I've done, nor does it show so much nuanced information." Thus: [7] Appears to be using dismissive words and phrases to describe his/her paper-based freehand design development sketches design ideation tools.

The following statement may indicate 07 having an overview of his design process: "And after that I move onto...the axonometric." But does it? As I recall, he had laid out his larger drawings on the floor next to where he was sitting, so he may have seen the axonometric as he tabled previous drawings. I thus choose not to allocate a category here.

I am interested in the move After a somewhat lengthy pause 07 tables 1 sheet of tracing paper showing hand-drawn coloured lines (red) over the floor plan already tabled followed by a somewhat brief account of the sketch: "This is just the circulation, I'm having a go at that..." 07 seems to be continuing to make his own decisions about what to show me and when, but it is puzzling, I think, to find him saying so little about this sketch. [68] Respondent turns a page without apparent encouragement from the interviewer.

12. "...And after that I move onto...the axonometric." [07 tables 1 neat, carefully produced axonometric drawing, hand-drawn using straight-edges.]
GL: “Okay. At this point, are you still designing or are you now explaining what the finished scheme looks like?”

07: “...Yeah...basically...this is...the final concept...of my design...”

GL: “It’s very Peter Eisenman, isn’t it?”

07: [Laughing.] “Yeah. And I just showed it through...different...perspectives...axonometric. And soon after that, I did it on a CAD model.”

I wonder if this is a case of produces and uses paper-based isometric drawings, hand-drawn using a straight edge, to explain dimensional information on characteristics of a spatial design speculation matter to him/herself or others in response to a spatial design matter? Because they are all presented one after another having been lifted from their place on the floor, I think there are strong reasons to regard all of the drawings recently tabled as connected, perhaps by being different views of the “final concept”. Also interesting is that 07 had the digital resources available to enable him to produce an axonometric – and, indeed, the plans and section – but he still produced hand-drawn versions.

Does 07’s use of “basically in “...basically this is...the final concept...” indicate the use of dismissive language? As argued above, I think not. I think 07 is saying, “In essence, this is the final concept,” rather than, “This is merely the final concept.” But I also wonder about the “just” in this: “And I just showed it through...different...perspectives...axonometric.” I think there may be an element of “And I merely produced these drawings before going on to produce a more visually impressive CAD model.” Maybe... Thus: [7] Appears to be using dismissive words and phrases to describe his/her paper-based freehand design development sketches design ideation tools.

I note the move 07 tables a neat, carefully produced axonometric drawing, hand-drawn using straight-edges and wonder if it again shows 07 ‘driving’ this interview: he has brought, and made available on the floor, a selection of large drawings produced by hand using straight-edges, and is taking me through them, often quite briefly, one at a time, in the order he has determined (even if it is a random order). 07 says little about this drawing to begin with: “...And after that I move onto...the axonometric.” On being questioned by me, he adds more: “...Yeah...basically...this is...the final concept...of my design...And I just showed it through...different...perspectives...axonometric. And soon after that, I did it on a CAD model.” These statements appear to focus on the drawings per se, rather than the design itself. Indeed, when asked by me, “It’s very Peter Eisenman, isn’t it?”, 07 laughs and says, “Yeah.” I wonder why this was? Perhaps 07 thought I was not interested in the design concept (although I suspect that this was unlikely because I raised the subject of Peter Eisenman with him). Perhaps he thought I was more interested in the drawings per se (although I suspect that this was unlikely because I raised the subject of Peter Eisenman with him). Perhaps he was reluctant to talk about the concept (although I suspect that this was unlikely because he had raised the subject of Peter Eisenman on more than one occasion previously). I find this move a puzzle, however: [68] Respondent turns a page without apparent encouragement from the interviewer.

13. [07 spends quite some time looking for evidence of the CAD model, finally bringing his laptop into view. The image shown is 1 digital plan of the design intervention in situ.] GL: “…This is AutoCad?”

07: “Yeah...This is just a plan view...[07 rotates the view to produce 1 isometric showing, in grey and white tones, floor and wall planes and structure] And this is what it actually looks like...” [07 begins zooming in on this isometric drawing.]

GL: “…How long did it take you from these early sketches to get to here?”

07: “...It would take about...five weeks.”
This sounds like a case of: Uses CAD software to produce produces and uses plan drawings may be used to explain the characteristics of a spatial design speculation matter to him/herself or others in response to a spatial design matter, and Uses CAD software to produce produces and uses computer-based 3D drawings may be used to explain the characteristics of a spatial design speculation matter to him/herself or others in response to a spatial design matter. To what extent are these drawings connected? Well, they appear to be different views generated out of a three-dimensional digital model, so they are connected in that respect—they are, in essence, the same drawing. More interesting is 07’s statement: “And I just showed it through…different…perspectives…axonometric. And soon after that, I did it on a CAD model.” I think this may indicate a clear connection between the digital drawings and the preceding drawings produced by hand using a straight edge: those preceding drawings enabled 07 to develop this three-dimensional model. I may be wrong about this, but my practical knowledge of design ideation indicates that this may well be likely.

I wonder if 07’s comment, “This is just a plan view…”, indicates a dismissive use of language? I suspect not. I think 07 is being accurate: there is an isometric view which is spatially more informative and visually complex than a plan view (“And this is what it actually looks like…”), but it is not a “lesser” drawing.

GL “Okay…We’ve got a complete package here from freehand sketches through to plan drawing through to sections, isometric, then we’re producing digital images in plan and in…isometric again…”

14. GL “…Quite a lot of what you’re showing here is two dimensional work and that’s not a criticism…Were you designing by then in two dimensions because you could see it in your head as a three-dimensional thing – how did it work for you?”

07 “What d’you mean by that?”

GL “…What I mean is…if we look at your sketchbook…[At GL’s request, the laptop is put to one side revealing the isometric discussed above, and there is some searching through drawings previously discussed, focusing on a page in the larger (A3, perhaps) sketchbook not seen before during this interview, which 07 tables showing 5 or more paper-based freehand perspective sketches of partitions and structural elements, hand coloured, and very little hand-writing (”Wall Structure Ideas”, “Geometrics”, “Square/Rectangles”) plus 1 paper-based freehand sketch diagram, content unclear] Yes, that’s actually what I mean. [Another sketchbook (the smaller one discussed at the start of this interview) is tabled showing sketches seen before during this interview: preliminary paper-based freehand sketches including the ‘drum-like’ structure with a human figure shown within it] Have you got more examples of…sketch development that led you to these…plan ideas that you showed?”

The description of the first set of sketches sound like a case of Produces and uses paper-based freehand perspective sketches to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter, Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter, Produces and uses paper-based freehand sketch diagrams to ask (and attempt to answer) questions about space planning concerning his/her design proposals in response to a spatial design matter. 07’s tabling of the second set of sketch diagrams, sketch perspectives and hand-written text previously seen near the start of the interview is intriguing. He appears to table both sets in response to my question about when he started to think in three-dimensions about his design proposals (which have, by this point in the interview, appeared in three-dimensional digital form). This may indicate that these two sets of sketches are connected, but I cannot be sure. 07 may have offered them as separate items of evidence of three-dimensional thinking. I have noted these conjectures on the tabulated results for both sets of items.

07 “…[07 points to the sketchbook material described above, turning pages in both sketches with both hands] So again these were the…early stages…”
I am interested in 07’s moves 07 points to the sketchbook material described above, turning pages in both sketches with both hands. The extent to which the material in each sketchbook is connected is perhaps hinted at by these moves (I have discussed this elsewhere), but I wonder what else they may indicate? I think they may indicate the respondent, well aware of what is in his sketchbooks, keen to explain what he thinks (or he thinks I think) is an important point: he carried out a lot of three-dimensional design exploration. I also think they may indicate someone who has quite a developed design methodology and is capable of explaining his ideas and process with some clarity and dexterity: [6] Respondent turns a page without apparent encouragement from the interviewer and [69] Respondent points to a page or an item on a page without apparent encouragement from the interviewer. I feel there may be more to these moves, but I am unsure what yet.

15. 07 “[07 turns a page in the smaller sketchbook to return to 1 paper-based freehand perspective sketch showing a possible façade treatment, with shading and images of people, plus hand annotation, plus a paper-based freehand plan sketch showing the pattern of structural elements in some detail, plus hand-annotation (discussed and sub-categorised above, near the start of this interview). He also turns a page in the larger sketchbook to reveal 4 paper-based freehand perspective sketches of façade treatments, one colour-rendered, plus 4-5 paper-based freehand elevation sketches of façade treatments, and one hand-written word: “MDF”]…from getting the…façade and…trying to make it look very Peter Eisenman…”

This sounds like a case of [6] Produces and uses paper-based freehand perspective sketches to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter, [39] Produces and uses paper-based freehand elevation sketches to ask (and attempt to answer) questions about space planning concerning his/her design proposals in response to a pre-existing spatial design speculation matter and [4] Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter. To what extent might the above items be connected? Well, the perspective sketches share the same two-page spread as 4-5 paper-based freehand elevation sketches of façade treatments, and 1 hand-written word: “MDF”, and it may be that they were produced in conjunction with those items. Most, if not all, of the sketches appear to show different options for the elevation to the retail unit, and look to me as though they were produced as connected images as 07 conjectured on what the elevation might look like in order to be “…very Peter Eisenman…” Also, the text appears to annotate one of the perspectives. All this, I think, adds up to a series of connected items. Also, by tabling a series of sketches and hand-written text tabulated much earlier, 07 may be demonstrating that these more recently tabled items might connect to those much earlier ones – indeed, I cannot be sure when the more recent items were created.

16. GL “And what’s the function of the two different sized sketchbooks? Is that portability?”

07 “…Yeah…[07 flicks through the smaller sketchbook] this one’s just like really quick sketches whereas this…”

07 “[07 turns a page in the larger sketchbook to reveal further paper-based freehand sketches, all perspective/isometric views, one colour-rendered, with some hand-written text. These comprise 2 paper-based freehand sketches showing structural elements in isometric/perspective, almost as wire-frame images, plus at least 4 paper-based freehand sketch diagrams showing constructional and dimensional information, plus hand-written text including: “Type of glass.”, “Interlayer – laminated”, “LED (light emitting diode)” and “PILLAR MEASUREMENTS”. Next to this is 1 paper-based freehand sketch elevation, very rudimentary. From the smaller sketchbook, 07 has revealed, again, the hand-coloured sketch showing people standing in front of display units and casting shadows across the floor, plus the text “Lights up/Illuminates the room/appealing at night time”)…is for my actual idea…”

The above discussion also sounds like a case of: [6] Produces and uses paper-based freehand perspective sketches to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter, [33] Produces and
uses paper-based freehand sketch diagrams to ask (and attempt to answer) questions about space planning concerning his/her design proposals in response to a spatial design matter.

[39] Produces and uses paper-based freehand elevation sketches to ask (and attempt to answer) questions about space planning concerning his/her design proposals in response to a spatial design matter, and [4] Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals in response to a spatial design matter. To what extent do these items appear to be connected? Well, details on the isometric/perspective sketches appear similar to details in the elevation sketches, and in the diagrams. Also, the text appears to be annotation to the diagrams.

I wonder if 07’s use of “just” in the following indicates the use of dismissive language: “…this one’s just like really quick sketches whereas this is for my actual idea…like, the measurements and everything.” I suspect 07 was not being dismissive but accurate: he was saying that quick sketches are not as complex or complete or important as the final idea. I do not think 07 was saying, this sketchbook contains work that is not very good so please don’t look too closely at them, but rather, this sketchbook contains work that is less complex, detailed and complete, and therefore less important in the greater scheme of things.

I do not propose to sub-categorise the move 07 flicks through the smaller sketchbook or the work revealed because 07 was responding to my question, and did not reveal anything new about the work revealed. However, the above discussion provides an interesting insight into what a sketchbook might be – a variety of containers which offer more or less portability and facilitate more or less experimental/speculative/speedy work:

GL “And what’s the function of the two different sized sketchbooks? Is that portability?”

07 “…Yeah… this one’s just like really quick sketches whereas this is for my actual idea…like, the measurements and everything.” I wonder if this merits a new Sub-Category? But what might it be? And why might it be helpful? To address the latter first, I have found that certain respondents used more than one sketchbook, describing each as having a different function and/or size. I have found that some respondents, having defined these various functions, then seemed unclear or even inconsistent about them. I have found that some respondents appeared unable to find work to show me because it was in a sketchbook they had not brought – or they thought they had not brought, later on finding that they had brought it. On a slightly different matter. I have found that some respondents have described their sketchbook as “unfinished” or “not finished yet” because something missing needed to be added to it or stuck in later. Where do all these sketchbook-related observations take me in research that considers design ideation moves and connectedness? I think what interests me to begin with is how the students regard their sketchbook/s. A student with more than one sketchbook, each with a different function, suggests to me that s/he has quite an organised approach to design ideation: s/he seems to expect to do different types of ideation, and/or in different settings, and so uses different sizes of sketchbook with different functions. However, this organised approach may be more or less a myth: the student may in fact not use the sketchbooks as explained, or find that so many sketchbooks are a problem because s/he cannot track down work. So what does this add up to? A Category of Uses more than one sketchbook keeps it simple. It might cover someone completing one sketchbook and then starting another – not what I am interested in – but I do not think any of my respondents did that. I do, however, want to address that the sketchbooks have – or are claimed to have – different functions, thus, Uses multiple sketchbooks, which s/he describes as having different functions. This might allow a Dimension of Uses effectively…Uses Ineffectively but, although the respondent who seems very confused about the functions of her various sketchbooks might be placed on this spectrum, it is less easy to place others on it: for example, respondent 07 defines one sketchbook as being for “…really quick sketches…” and another for “…my actual idea…like, the measurements and everything.” But the distinction between “…really quick sketches…” and “…my actual idea…” may be one I would struggle to make. Also, I note that respondent 07 also had loose drawings on A1 paper, plus work on a laptop, plus a blog: multiple platforms. Perhaps I need to simply note that the respondent Presents his/her ideation work using multiple platforms, and then note which platforms, what s/he said about them and what I think – reflexively and in response to the data – about that. Thus: [70] Presents his/her ideation work using multiple platforms. Let’s see…
A student who intends to go back to a sketchbook later to add more material suggests to me that s/he is someone who has a notion of what a sketchbook ought to look like – a notion derived from whom, and when? But this can wait until such data emerges in the interviews: 07 is not, as far as I can tell, such a student.

17. 07 “… is for my actual idea… [07 flicks through the larger sketchbook to a page showing 4 paper-based isometric/perspective sketches, and 7 paper-based freehand sketch diagrams accompanied by hand-written text (“side (elevation),”, “most commonly used”, “glass blocks”, “MDF Boards Thickness – 25mm”, “different positions!”, “Aerical” [sic], “Timber Structure”, “circulation side” and (in connection with numbers) “MM”) plus 2 paper-based freehand sketch elevations (one very rudimentary, one hand-dimensioned with dimension lines)] [07 removes the smaller sketchbook from view]

GL “…So here we see… [GL points to the paper-based freehand sketches showing structural elements in isometric/perspective, almost as wire-frame images, in the larger sketchbook] working in three dimensions… beginning to explore a volume… a structural system, or a spatial division… and now we’re looking at number here, we’re looking at proportion and size…” [Unbidden, 07 moves the sketchbook to provide a better view of the sketch elevation.]

This sounds like a case of [6] Produces and uses paper-based freehand perspective sketches to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter (4 paper-based isometric/perspective sketches), [33] Produces and uses paper-based freehand sketch diagrams to ask (and attempt to answer) questions about space planning concerning his/her design proposals in response to a spatial design matter (7 paper-based freehand sketch diagrams), [4] Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals in response to a spatial design matter (hand-written text (“side (elevation),” “most commonly used”, “glass blocks”, “MDF Boards Thickness – 25mm”, “different positions!”, “Aerical” [sic], “Timber Structure”, “circulation side” and (in connection with numbers) “MM”), and [39] Produces and uses paper-based freehand elevation sketches to ask (and attempt to answer) questions about space planning concerning his/her design proposals in response to a spatial design matter (2 paper-based freehand sketch elevations (one very rudimentary, one hand-dimensioned with dimension lines)). What clues are there that these items are connected with each other? Well, the hand-written text appears to be linked directly to the diagrams, in some cases by hand-drawn arrows or by hand-drawn circles, and in all cases because it is written in close proximity to the diagrams. Also, there is visual evidence that some of the isometric/perspective sketches and some of the diagrams explore similar design options, and do one of the diagrams and one of the elevations.

I note the moves Unbidden, 07 takes away the smaller sketchbook containing the paper-based freehand perspective sketches showing possible façade treatments and Unbidden, 07 moves the sketchbook to provide a better view of the sketch elevation. These moves suggest to me that 07 felt in quite a lot of control during this interview. It seems that he decided when the smaller sketchbook was no longer to be looked at – perhaps because it was no longer relevant, or because he did not want me to look at it any more, or for some other reason I cannot ascertain – and he decided to move the sketchbook so that I could see it better – perhaps to be helpful to me, perhaps to show something better that he wanted me to see, perhaps for some other reason I cannot ascertain. [68] Respondent turns a page without apparent encouragement from the interviewer.

18. 07 turns a page in his larger sketchbook, passing en route over 3 rudimentary paper-based freehand perspective sketches (not discussed) to reveal 1 page containing quite a lot of hand-written text (including “Final Design”, “Materiality”, “Glass Blocks”, “most common used is…”, “Timber” and more hand-written text concerning materials and construction); followed by 1 page of paper-based freehand sketches: 5 paper-based plan diagrams of different sizes plus hand-written text (“Main Area”, “Retail Store”, “– Counter and Shelves”, “–
Playing with structure”, “breaking Conventional Methods” and more I cannot read); plus 1 paper-based freehand ‘wire frame’ perspective (all not discussed).

This sounds like a case of [06] Produces and uses paper-based freehand perspective sketches to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter (3 rudimentary paper-based freehand perspective sketches…); plus [04] Uses a word-based approach to ask (and attempt to answer) questions about other design proposals in response to a spatial design matter (1 page containing quite a lot of hand-written text (including “Final Design”, “Materiality”, “Glass Blocks”, “most common used is…” “Timber” and more hand-written text concerning materials and construction); plus [03] Produces and uses paper-based freehand sketch diagrams to ask (and attempt to answer) questions about space planning concerning his/her design proposals in response to a spatial design matter (5 paper-based plan diagrams of different sizes); plus [04] Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals in response to a spatial design matter (hand-written text (“Main Area”, “Retail Store”, “Counter and Shelves”, “– Playing with structure”, “breaking Conventional Methods” and more I cannot read; some of this text is circled by hand); plus [06] Produces and uses paper-based freehand perspective sketches to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter (1 paper-based freehand ‘wire frame’ perspective).

[07 repositions his sketchbook to show the 1 paper-based freehand ‘wire frame’ perspective quite clearly.]

These moves are quite mysterious inasmuch as they reveal a lot of visual material but 07 says nothing about them. What might have been going on during the interview at this stage, as 07 flicked through his sketchbook not discussing the work revealed? Immediately after, 07 says (see below): “And then…soon after that…kinda…goes to the final final concept…where I have…like the…meaning.” This suggests that perhaps he felt in a hurry to move beyond yet more paper-based freehand sketches and yet more hand-written text to work that was of greater interest and/or importance. Or, perhaps, he thought the work was not very good and did not want me to look at it for too long. Or, perhaps, he thought I was keen to move on. I cannot tell. This is a case of: [08] Respondent turns a page without apparent encouragement from the interviewer.

07 “And then…soon after that…kinda…[07 turns a page in his larger sketchbook and repositions the sketchbook to reveal clearly 2 paper-based freehand perspectives (one smaller, one larger, the latter including a ghostly image of a human figure); 2 paper-based freehand plans (one smaller, one larger); and quite a lot of hand-written text including “I have made created meaning through the position of my architecturals structures”, “hard to get through, again to refer back to Peter Eisenman’s quote ‘We need to displace this concept of architecture as a service, as an accommodating profession, as one that people inhabit – or to ‘grow used to’”, ‘A conventional retail is opened space. However…” and more I cannot read goes to the final final concept…where I have [07 points with his hand to the paper-based freehand perspective including a ghostly image of a human figure]…like the…meaning.” [07 points with his hand to the larger paper-based freehand plan, then back to the paper-based freehand perspective including a ghostly image of a human figure.]”

[07 seems to be leafing through something off camera.]

GL “So you’re using text to explain to others and maybe to yourself the ideas, the meaning behind this?”

07 “Yeah.”

GL “So, we’ve got layout…’d be interested to see how that compares with the plan drawing, I think it’s quite similar isn’t it?” [07 removes the sketchbook being discussed.]

07 “Mmmhhmm.”
I think the above is a case of [6] Produces and uses paper-based freehand perspective sketches to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter (2 paper-based freehand perspectives (one smaller, one larger, the latter including a ghostly image of a human figure)). [31] Produces and uses paper-based freehand plan sketches to ask (and attempt to answer) questions about space planning concerning his/her design proposals in response to a pre-existing spatial design speculation matter (2 paper-based freehand plans (one smaller, one larger), and [4] Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals in response to a spatial design matter (quite a lot of hand-written text including "I have made created meaning through the position of my architect structures", "hard to get through, again to refer back to Peter Eisenman’s quote 'We need to displace this concept of architecture as a service, as an accommodating profession, as one that people inhabit – or to 'grow used to’", "A conventional retail is opened space. However…" and more I cannot read). Phew! So much to analyse based on so little discussion! More may emerge as the interview develops, but we will have to wait and see…

18. [Once the sketchbook is taken away, it reveals the isometric drawing produced with straight-edges, discussed above, then the plan drawing on tracing paper produced with straight-edges, discussed above, then the plan drawing hand-drawn with straight edges, seen previously. Then 07 brings the sketchbook showing the plan view mentioned above back.]

GL “So we look at that, yes it actually is quite similar…There are some adjustments but the layout is quite clear here already [GL points to the earlier sketch plan and to the plan drawing hand-drawn with straight edges, seen previously]…And you had some perspectives here, do they follow-on from…the sketch views?”

What clues are there about how connected these items are? Well, the 2 sketch perspectives may have been used in conjunction with each other and with the 2 paper-based freehand plans (one smaller, one larger) because they all appear to show similar features (eg: columns, partitions, glazed openings etc) which suggests that they were used in concert to explore these features. Also, some of the hand-written text appears to be linked to the larger plan sketch by a hand-drawn arrow, and linked to the larger perspective sketch by being very close to it. All this suggests that all these items were used in a connected way. 07’s phrase “…soon after that…” below suggests a possible (but not certain) link between this work and that preceding it. GL “So we look at that, yes it actually is quite similar…There are some adjustments but the layout is quite clear here already…And you had some perspectives here, do they follow-on from…the sketch views?” That said, we should note that 07 does not answer my question here. I note also that 07’s removal of his sketchbook to reveal the isometric drawing produced with straight-edges, discussed above, then the plan drawing on tracing paper produced with straight-edges, discussed above, then the plan drawing hand-drawn with straight edges, seen previously might suggest that he saw these items as connected to this work, but this move may have been in response to me saying, “I’d be interested to see how that compares with the plan drawing, I think it’s quite similar isn’t it?”

I wonder if I should sub-categorise 07’s written statement, “again to refer back to Peter Eisenman’s quote ‘We need to displace this concept of architecture as a service, as an accommodating profession, as one that people inhabit – or to ‘grow used to’”? I think so. 07 may or may not have done new research that prompted this statement, but the fact that he chose to write it here I regard as worth noting – it may be that he found something new in the research that he had carried already out. Thus: [45] Carries out non-pictorial visuo-spatial research (eg: textual, auditory, interview based…) in support of design ideation. What clues enable me to determine how connected this research is? Well, 07 says little about it here. He may have read a number of texts by or about Peter Eisenman, over a period of time, or just one, once. Overall, the data does not contain enough detail to make this clear. That said, I think 07’s mention here needs to noted.

The moves 07 turns a page in his larger sketchbook and repositions the sketchbook to reveal clearly 2 paper-based freehand perspectives…07 seems to be leafing through something off camera… and Then 07 brings the sketchbook showing the plan view mentioned above back again appear to indicate someone who feels very much inclined to lead the interview. To
begin with, he seems to have been trying to drive the narrative (07 "And then…soon after that…"), and the last of these moves seems to have involved him wanting to re-instate the sketchbook he'd removed because earlier on I had implied that I wanted to see the drawings underneath it. Why might he have been making these moves? Perhaps to be helpful to me, thinking that that was what I wanted him to do. Perhaps because he had a clear understanding of what it was he wanted me to see, and when he wanted me to see it. Perhaps he wanted to move the interview along. Perhaps he thought that, if left to me, I wouldn’t know what work he had to show me. I cannot tell. [68] Respondent turns a page without apparent encouragement from the interviewer.

The moves 07 points with his hand to the paper-based freehand perspective including a ghostly image of a human figure and 07 points with his hand to the larger paper-based freehand plan, then back to the paper-based freehand perspective including a ghostly image of a human figure seem interesting. 07 seemed to me to be quite emphatic here, but I wonder why he chose to point to the items in particular. The key phrase associated with the second move seemed to be "the meaning", suggesting, perhaps, that, after all the research, sketching, drawing and more, "the meaning" was what was key to 07. There may, of course, have been another reason for these moves but I do not know what it was. [68] Respondent points to a page or an item on a page without apparent encouragement from the interviewer.

Does 07’s tabling of numerous sketches and hand-written text without saying much – or anything – about them need to be categorised? I have elsewhere that students on occasions showcase work without discussing it, and wondered if the student was being evasive. However, if I were the student being interviewed, I may have had several things going through my head as I showed my work, including: surprise at what I was seeing – but had forgotten – in my own sketchbook; concern that the interviewer got what s/he wanted; uncertainty about what it was that the interviewer actually did want; uncertainty about what my design approach actually was, as manifest by the work unfolding in front of me; concern that I did not look foolish to this stranger; and more. So I think I should categorise this move as [71] Student showcases work without explaining and/or discussing it.

19. [07 brings into view a sheet (A2) showing a print of various CAD drawings: 1 floor plan, 2 plan perspectives, 4 isometrics (one larger than the other 3, 1 a wire-frame view, the other 3 solid). Then he looks for and, after a little while, tables a print of 1 digital exploded isometric drawing of the design proposals in situ.]

07 "…Diagram of the area."

[Then he shows prints of 2 digital plan drawings.]

Are these prints of the CAD drawings discussed earlier? Having looked carefully at them, I’m inclined to think that, apart from the exploded isometric, they are: the viewpoints are different but the basic model seems to be the same (as much as I can tell). And, as 07 says nothing about these drawings except to call the exploded isometric a “diagram” which is not how I would categorise it), I have nothing to add to the analysis already carried out, except that I need to document the tabling of the exploded isometric here: [68] Uses CAD software to produce produces and uses exploded isometric drawings may be used to explain the characteristics of a spatial design speculation matter to him/herself or others in response to a spatial design speculation matter to him/herself or others.

It is interesting to note that these drawings are tabled in response to my question, "...And you had some perspectives here, do they follow-on from...the sketch views?" I do not think I was asking about CAD drawings but hand-drawn perspective views, but 07 tables prints of digital drawings instead. On other occasions, students appear to have not answered my questions about work they are showcasing, either ignoring it completely or else moving on (as if answering another question I didn’t ask instead). I have at times likened this to a 'fencing match' because it seemed to me that the student was being evasive, but this may have been a misunderstanding on my part – the student may have misunderstood the question, or understood it correctly and misunderstood the answer (or I may have misunderstood the answer), or not heard the question, or made these moves for other reasons I cannot know. I
think I should categorise all this as [72] Student appears not to answer the question that was asked.

I note that, again, 07 says almost nothing about these drawings. I think I should categorise this move as [71] Student showcases work without explaining and/or discussing it. But I wonder why he says nothing? Was he, perhaps, keen to keep going, knowing (as I did not) how much work he still had to show me? Perhaps: I had already explained that I would interview him for around 30 minutes. Did he think he had said all he needed to about these drawings? I cannot tell, but feel this ‘move’ needs to be noted.

The moves 07 brings into view a sheet (A2) showing a print of various CAD drawings…Then he looks for and, after a little while, tables a print of 1 digital exploded isometric drawing of the design proposals in situ… and then he shows prints of 2 digital plan drawings suggest [69] Respondent points to a page or an item on a page without apparent encouragement from the interviewer. I am aware that 07 may not be literally turning a page here, but lifting a drawing off the floor and bringing it to the table, but I don’t think that is the issue.

20. 07 “…Also I did quite a few perspectives, hand rendering.”

[07 tables 1 perspective view of the outside of the proposed retail unit, hand-drawn with straight-edges and watercolour rendered, including 1 faintly-drawn human figure.]

07 “This was…[07 points to the perspective visible] the second idea. But this…is the third one [07 tables another perspective view, hand-drawn with straight-edges and watercolour rendered, including 2 corrugated cardboard human figures sellotaped to the drawing].”

GL “…Why did you produce these drawings, these particular drawings?”

07 “…To visualize…how it would look like…’Cos I wanted to…do it by hand before doing it in CAD…’Cos I kind of wanted to get that sense of…purity, rather than doing it on CAD…Whereas this is more natural…than digital format.”

GL “Okay.”

07 “It just…gives a sense of creativity.”

GL “Could you see this in your head already? In other words, are you explaining it here to others maybe or are you actually as you’re drawing it you’re finding out new things about it?

07 “I think, more like finding out new things about it…”

GL “[GL returns to the first perspective view tabled earlier, the view that is hand-drawn with straight-edges and watercolour rendered] So you took that previous idea quite far before deciding it wasn’t right for you…”

[GL refers to the first perspective view, hand-drawn with straight-edges and watercolour rendered.]

GL “…Did this drawing, for example, demonstrate to you that this idea wasn’t working? Did it…help you decide that there’s something better out there?”

07 “Well, it’s more like I wanted to focus my design on Peter Eisenman…rather than just designing a retail space for the sake of it ‘cos I want to go about through these…messages and semiotics…designing this for people ‘round the University.”

The above sounds like a case of [41] Produces and uses paper-based perspective drawings, hand-drawn using a straight edge, to explain information on characteristics of a spatial design speculation matter to themselves or others in response to a pre-existing spatial design speculation matter. What are the clues that indicate the extent to which these moves are connected to others? In terms of content, the first of these drawings, to my eyes, stands
separate from any other sketch or drawing 07 has tabled thus far. However, the second drawing is, in my opinion, of a similar style to the first, and does appear to relate to a number of earlier sketches and drawings. Thus, it may be argued that both drawings are connected to each other and, directly or indirectly, connected to earlier ideation moves. That said, 07’s discussion with me (GL “…Why did you produce these drawings, these particular drawings?” 07 “…To visualize…how it would look like…” Cos I wanted to…do it by hand before doing it in CAD…” Cos I kind of wanted to get that sense of…purity, rather than doing it on CAD…Whereas this is more natural…than digital format.” GL “Okay.” 07 “It just…gives a sense of creativity.” GL “Could you see this in your head already? In other words, are you explaining it here to others maybe or are you actually as you’re drawing it you’re finding out new things about it?” 07 “I think, more like finding out new things about it…” ) provides no insights into the connectedness of these drawings.

I wonder if the “just” in 07’s “It just…gives a sense of creativity” indicates the dismissive use of language? I think not. I think here that 07 is saying (as I think I would in this situation), “Producing hand-drawn perspectives simply allows me to see things in a more creative way,” rather than, “Producing hand-drawn perspectives is an inferior way of working.”

The moves 07 tables 1 perspective view of the outside of the proposed retail unit and 07 tables another perspective view… are interesting, I think. As has been the case during much of this interview, 07 makes these moves without any apparent encouragement from me. He appears to be more or less clear about what he wants to show me, and follows this plan (if plan it is) without asking my permission, waiting for me to indicate a preference, or even waiting for me to indicate that I am ready to move onto one or more new moves. What thoughts inform plan (if plan it is) I cannot tell. If I were in his position, I imagine I might by now have stopped being the student being interviewed by a stranger, and had moved into a different role, the student being interviewed by a tutor. and, being more familiar with that role, I might be inclined to take the lead. I do not know if 07 felt or thought like this, however. [68]

Respondent turns a page without apparent encouragement from the interviewer.

The move 07 points to the perspective visible is perhaps less significant than some pointing moves identified earlier. 07 seems to be directing me to “… the second idea” as opposed to “the third one” (both of which have been tabled) so I do not see this move as worthy of scub-categorising.

21. GL “And the Peter Eisenman part of this, did you do research into Peter Eisenman…?”

07 “Yeah…synopsis…”

[07 looks for evidence of his research into Peter Eisenman and GL chats to him about this. 07 then asks if he should “read some” and GL says, “Please do.”]

07 “Well he says that… [07 mentions Eisenman’s discussion of ‘anthropocentric’ and ‘technocentric’ architecture at some length, reading extensively from his notes]…so I just…wanted to…use that idea of…not using…CAD all the time…to produce my…designs [07 moves some of his tabled drawings to reveal CAD work already discussed]. I want to kind of have that sense of free flow…design with symbols and meanings [07 reads more from his notes on Eisenman]…”

The above discussion sounds like another case of: [45] Carries out non-pictorial visuo-spatial research (eg: textual, auditory, interview based…) in support of design ideation – non-visual because 07 talks of theory (Eisenman’s discussion of ‘anthropocentric’ and ‘technocentric’ architecture) and refers to written notes. I acknowledge that 07 may have been researching by looking at images of Eisenman’s designs but what 07 says here focuses very much on theory, not on the appearance of things.

GL “So was it unusual that you were producing these hand-drawn images, was it unusual here, were your other students more inclined to work on computers? Or were you all doing this?”
...I think it was...normal to do...on paper...you wouldn't go about doing it on CAD straight away...you would first do it on a piece of paper...to get your ideas across, getting...the measurements...

The above discussion seems to add to [6] Produces and uses paper-based freehand perspective sketches to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter above: another insight into how 07 and, as he described it, his fellow students approached design ideation, keeping the perspective drawings necessarily separate from the CAD ones.

I am intrigued by the moves 07 then asks if he should "read some" and GL says, "Please do." Having argued up until now that 07 felt very much 'in the driving seat' I am interested to note that here he was asking my permission. Why, I wonder? Having revealed one sketchbook page, drawing and CAD image after another without seeking permission, why did he here ask me if I wanted to hear the material on Peter Eisenman? I suspect it may have been because he was moving away from showing and discussing visual work to reading a fairly lengthy piece of written text, but I also note that this suggests he did, at a deeper level, see me as leading the interview – at least when it moved into less familiar territory.

GL "And your approach here...if I may summarise...you showed the small sketchbook first, and you showed some early ideas and an...interest in Peter Eisenman, then there's the larger sketchbook with other drawings coming through, we can see them there, and then you're moving to...straight-edge drawing, plans, sections, isometrics, and then you're moving to some computer-aided design work...that process of moving from one kind of approach to another, was that your idea or were you guided...?"

07 "...I was guided...So we would learn more about...the technology and CAD, and how they work...cos now a lot of people use...CAD and...V-Ray...to make a concept seem more realistic...and real-life."

GL "And what do you think of that?"

07 "...I think it's...a perfect thing...to do so...you can visualize it clearly and you can see it very well, and it just...gives more satisfaction rather than having a piece of paper."

The above sounds like a case of [29] Is being guided by previous educational experiences internal educational experiences. 07, and his classmates, were in receipt of guidance from their tutors about how to produce CAD drawings, but I am not sure 07 has confirmed here that he and his classmates received advice on how to integrate hand-drawn and digital ideation moves.

GL "...When you say, 'Have it on a piece of paper', do you mean as compared to having it digitally on a screen, is that what you mean, or when you say 'Have it on a piece of paper' you mean draw it on paper? I'm not quite following you here...[07 asks for clarification] When you were talking about people...using CAD to produce concept drawings that look more real, they would print those out wouldn't they? But it's a digital image rather than a hand-drawn image. I think that's what you're saying...So you were guided...in what to do and when to do this...Were you told, don't use a computer to begin with, don't work on CAD to begin with...?"

I think 07 cannot follow what I was getting at here, so I choose not to sub-categorise it.

07 "...Yeah...they told us to...do it on A2 paper first."

GL "A2 paper first to produce these kinds of drawings that you see here, is that right?"

07 "Yeah...And then we had...lectures with our...tutors on just...basic uses of CAD...just making like squares and circles..."

GL "...Gradually developing your knowledge and your skills."
The above seems to add more to my analysis of [29] Is being guided by previous educational experiences internal educational experiences. The following statement by 07 suggests here was advice on how to use hand-drawn and digital drawn work effectively: “…they told us to…do it on A2 paper first.”

I wonder if the “just” in “…so I just…wanted to…use that idea of…not using…CAD all the time…and it just…gives more satisfaction rather than having a piece of paper…And then we had…lectures with our…tutors on just…basic uses of CAD, just making like squares and circles…” indicates what I have termed the dismissive use of language? I think not here. I do not think 07 was saying, in effect, “This was not very important or difficult or interesting work,” but, rather, “This was simply what I did.” His discussion elsewhere indicates that he was keen on this non-CAD-based approach and not likely to be dismissive of it. That said, the use of “just” in 07’s “…lectures…on just…basic uses of CAD…just making like squares and circles…” might be 07 saying, in effect, “We were only making simple shapes.” But is this likely? 07 seems to be saying that the CAD lectures did not deal with how to produce complex drawings, but rather with how to produce simple shapes. That sounds like an accurate description of the lectures; I am not convinced 07 was saying, in effect, that the lectures did not teach him much of use.

22. GL “Could you please bring those two sketchbooks back here…onto screen…?” [07 does as requested, revealing, firstly, the larger one, showing 2 paper-based freehand perspectives (one smaller, one larger, the latter including a ghostly image of a human figure) plus 2 paper-based freehand plans (one smaller, one larger), plus and quite a lot of hand-written text.] All of the foregoing is already sub-categorised. I may have material to add to that later on, but for some time to come this sketchbook simply sits on the table, open at this page and not discussed, on camera perhaps because GL asked 07 to table it.

GL “So if we start with this one here [GL is pointing to a page of paper-based freehand sketches in his smaller sketchbook, not seen before during this interview, showing 3 perspective/isometric-type paper-based freehand sketches plus 13 or so paper-based freehand sketch diagrams (7 elevational, 1 an isometric and the rest more difficult to determine), plus hand-written text (“east”, “west”, “south”, “north”, “counter ideas”, “Retail Experience”, “Make it Interactive!!” and “Kiosk”), all seeming to explore ideas for this design intervention]…Do you discuss these drawings with your tutor?” This looks like a case of: [6] Produces and uses paper-based freehand perspective sketches to ask (and attempt to answer) questions about his/her design proposals in response to a pre-existing spatial design speculation matter, [33] Produces and uses paper-based freehand sketch diagrams to ask (and attempt to answer) questions about space planning concerning his/her design proposals in response to a spatial design matter and [4] Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals in response to a spatial design matter. 07 says nothing here about these sketches. To what extent might these various design ideation moves be connected? Well, most, if not all, of the hand-written text appears to annotate the sketch diagrams, and at least two of the perspective sketches appear to explore similar issues to some of the sketch diagrams. I therefore conclude that these ideation moves are to some extent connected, even though 07 says little about them.

I note that ask 07 to do something here – “Could you please bring those two sketchbooks back here…onto screen…?” – and he does it. This is, perhaps, a contrast to 07’s tendency, in general, during this interview to turn pages without being asked. Here, I asked, and he did as asked without, as far as I could see, any sense of reluctance.

23. 07 “…[GL turns a page in 07’s smaller sketchbook to reveal 1 fairly large, vigorously drawn paper-based freehand sketch diagram (maybe a section) plus 5 paper-based freehand sketch diagrams (one of which is verging on being not a diagram but an isometric sketch, but does not quite make it in my opinion because it lacks a sense of reasonably accurate proportion. There is also hand-written text: ‘larger Box’, ‘Windows’, ‘Entrance’ and ‘How will it be communicated? Materiality? [unreadable]?’ Not necessarily, no…This is just more like a guide thing, and how I go about doing…my design.”
This looks like a case of: [33] Produces and uses paper-based freehand sketch diagrams to ask (and attempt to answer) questions about space planning concerning his/her design proposals in response to a spatial design matter and [4] Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals in response to a spatial design matter. 07 says little here about these sketches. I wonder to what extent the material showcased might be connected? Well, three of the annotated statements are linked to a diagram by hand-drawn lines, and one statement is written very close to another diagram, suggesting that it may be linked.

I wonder if 07’s “just” in “This is just more like a guide thing, and how I go about doing…my design” needs some consideration. Is it likely he is using this word dismissively? I think not. I suspect 07 was saying, “This is simply how I go about designing,” rather than, “This is only (or merely) what passes for design when I do it.”

I note that I am continuing to leaf through 07’s sketchbook here. I seem to have taken the lead, perhaps trying (for reasons I do not recall) to move the interview along, perhaps trying too find something new to discuss, perhaps trying to take the initiative away from 07? I cannot now say.

I also note that 07 is saying little about the work here. Is this a case of [71] Student showcases work without explaining and/or discussing it? Well, who was showcasing it? I was turning the pages, but 07 brought the work and tabled the sketchbook (albeit at my request), so there may be some debate about this. However, I am interested in the respondent not explaining and/or discussing his/her work rather than who revealed the work here. Thus: [71] Student showcases work without explaining and/or discussing it seems appropriate. I wonder why he might have done that? Perhaps he thought I was leading the discussion here (because I was the page-turner), so, if I asked, he would answer, but he would not offer more than he thought I wanted to hear. Perhaps he had little to say about this work? Perhaps I was page-turning too quickly for him to work out what to say? I do not know.

24. 07 “[GL is leafing through the smaller sketchbook showing two pages of hand-written text including “Glued Laminated Beams” and “Structural Solid Wood”, followed by another page of hand-written text including “Construction Considerations for Public Spaces”, followed by two more pages of hand-written text including “Quality and Tidiness”] This just more like ideas and…kind of like a mood board for me.” This sounds like a case of [4] Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals in response to a spatial design matter. However, 07’s mention of “a mood board” is interesting because this is not what I understand as a mood board, but rather pages of hand-written text. Also, the “just” in “This just more like ideas…” may need some consideration. Is it likely 07 is using this word dismissively? I think not: 07 is, I think, saying, “This is simply more ideas,” rather than, “This is merely more ideas.” If I had used that word in that context, that is how I would have meant it, I think: “You’ve seen plenty of my ideas thus far, and these are simply more of them, not an embarkation on something new and not seen before.” But I would not have used it dismissively, I think.

GL “Ah, interesting way of…describing it. Quite a lot of writing…as well.”

I note that I am continuing to leaf through 07’s sketchbook here. I seem still to be taking the lead – for what reason/s, I cannot now say (see discussion at 23. above).

I also note that 07 is continuing to say little about the work here. I think this is another case of [71] Student showcases work without explaining and/or discussing it. I wonder why 07 might have done that? Perhaps, again, he thought I (as the page-turner) was leading the discussion here, so, if I did not ask, he would say little or nothing: not more than he thought I wanted to hear. Perhaps he had little to say about this work? Perhaps I was page-turning too quickly for him to work out what to say? Perhaps he wanted to get to the end of this series of pages? I do not know.
Appendix F – Transcript of video-recording of respondent 11’s interview including categories, sub-categories applied and memos written by the researcher

This is included to illustrate how the researcher documented the following in written form: verbal and non-verbal interactions between the respondent, the researcher and the sketchbook material; and the content of the sketchbook material.

University of Bedfordshire
Institute for Research in Education (iReD)

Garry Layden – Main Study 2014-16 – Axial Coding

Respondent 11 – Level 6 Architecture – Student – Former Polytechnic

Began reading 18/12/14

Memo

Start of the ‘Museum Project’

1. 11 “We were given the option to choose from loads of different buildings, to create a new function for them…i decided to focus on Treadgold’s Museum, which is in Portsmouth, it just used to be an old workshop, so yeah, this is just the initial page, [inaudible 00:00:25 – “title page”, I think].” It may be important that this building was chosen by the student “…from loads of different buildings…” I note also that the student chose to produce a title page.

11 “Well…initially when it was first built, it was built as houses and then it became an ironmonger’s…and then after that closed, it became a museum displaying stuff that they used to make in the ironmonger’s…It’s got loads of layers of…adaptations to the building…so it’s not just one solid block, houses have been added, workshops have been added and removed and…” The phrase “It’s got loads of layers of…adaptations to the building…” is to my ears a quite ‘knowing’ phrase. “Layers” is a very architectural word – not one my students tend to use frequently, I think.

2. 11 “Yeah. This was inside the building [11 waves her hand over the freehand perspective sketch], that’s why I drew that…it’s not just a random drawing!” [11 is discussing 1 paper-based freehand perspective sketch, drawn with a pen, of a weighting/balancing device.] The phrase “…it’s not just a random drawing!” suggests a level of confidence and understanding.

GL “It’s interesting that you start with a drawing…why is that…?

11 “…I just like to get the feel of the building and by doing…by drawing out what’s inside, I find it a lot easier to…understand like textures, so I like seeing the inside…” This is an interesting discussion. 11 appears to be using paper-based freehand perspective drawing as a way of finding out about the building interior – of, in particular, finding out about the “feel” of the building, “understand[ing the]…textures”. So in what category/sub-category does that put this? The respondent is not designing, not producing design proposals, but is instead finding out about the building. Thus [5] Produces and uses paper-based freehand perspective sketches to ask (and attempt to answer) questions about his/her design proposals would not be appropriate. [20] Produces and uses paper-based freehand perspective sketches may be
used to explain the characteristics of a spatial design speculation matter to him/herself or others would be more appropriate: explain the characteristics...to him/herself... seems to be the equivalent of finding out about the "feel" of the building, "understand[ing the]...textures".

Is the word "just" in "...I just like to get the feel of the building..." a dismissive word? Why might someone use the word "just" in such a context? If I said, "I'm just off to the shops", it probably would not mean I am merely off to the shops, but, more likely, I am paying a quick visit to the shops but this won't be a major component of my day. I think this could be the same for 11: she is telling me that "...get[ting] the feel of the building..." is a part of what she has done during this project, but not a part of low or no value.

3. [11 turns a page to reveal 1 copy of a black-and-white photograph of workers (perhaps Victorian) standing outside the building, plus 1 paper-based freehand sketch, in pencil with tone added, of chains, plus 1 page of hand-written text: "Treadgolds, Ironmongers of Portsea...Originally formed in 1404 as houses..." – secondary research information, I think. There is also a number of paper coasters used, I think, as reminders of work to be done. The one I can see reads "structured analysis." This sounds like a case of [20] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others and [45] Carries out non-pictorial visuo-spatial research (eg: textual, auditory, interview based...) in support of design ideation. Why [20] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others? Because the photograph, although it shows people rather than the building, is in my opinion likely to be helping the student to understand the "feel" of the building. Why [20] Produces and uses paper-based freehand perspective sketches may be used to explain the characteristics of a spatial design speculation matter to him/herself or others? Because I am guessing that the perspective sketch of the chains is also the equivalent of finding out about the "feel" of the building, "understand[ing the]...textures" – the sketch seems to have a similar position. Why [45] Carries out non-pictorial visuo-spatial research (eg: textual, auditory, interview based...) in support of design ideation? Because there is abundant hand-written text: "Treadgolds, Ironmongers of Portsea...Originally formed in 1404 as houses..." – secondary research information, I think – plus text on a number of paper coasters used, I think, as reminders of work to be done – for example, "structured analysis".

I wonder if 11 turns a page to reveal 1 copy of a black-and-white photograph of workers... indicates that 11 saw herself as 'in the driving seat' here?

4. 11 "...So then I started to look at the history of the building...just looking at who owned it before...And yeah, just about the history of the Treadgolds. [11 turns a page in her sketchbook to reveal 1-and-a-half pages of hand-writing. She writes neatly and stylishly. The text seems to concern wider secondary research: "Portsea" and "Dockyard". Next to this is 1 paper-based freehand perspective sketch, drawn with a pen, and hand-rendered, of a set of wheels – some sort of Victorian machine, perhaps? There is also a number of paper coasters used, I think, as reminders of work to be done. The one I can see reads, inter alia, "dockyard" and "history of area – Portsea".][11 immediately lifts up the coasters, presumably to enable the work underneath to be seen more clearly, but by doing this she conceals other work previously visible in the sketchbook. She moves these coasters 3 times.] Still looking at what was in the surrounding area, so looking at the dockyard and things, how it's all machinery and...industrial kind of buildings." This sounds like another case of [20] Produces and uses paper-based freehand perspective sketches may be used to explain the characteristics of a spatial design speculation matter to him/herself or others and [45] Carries out non-pictorial visuo-spatial research (eg: textual, auditory, interview based...) in support of design ideation.

Does the use of "just" in "...just looking at who owned it before...And yeah, just about the history of the Treadgolds" indicate the use of dismissive language? I might use such a word concerning tasks that I thought were less important but not unimportant or valueless: say, if I were preparing a meal, "I'm just peeling the potatoes." (rather than parboiling and roasting...
them). If I said that, I would be being accurate for me – parboiling and roasting are more important and skilful jobs if I want good roast potatoes to be the final outcome. Thus, I do not think 11’s use of “just” is worth categorising here.

GL “So we’ve got drawings on just about every page at the moment…what are you trying to do with this drawing? Why did you provide that?”

11 “Just to show how the proximity between the museum and the dockyard…just to show the relationship that it has…they have to each other.”

GL “And what have you got there?

11 “That was inside the building, just a piece of machinery that I quite liked, so I thought…”

Is the use of “just” in “Just to show how the proximity between the museum and the dockyard…just to show the relationship that it has…they have to each other…” likely to indicate dismissive thinking? For the reasons given earlier, I think not. This respondent seems to be being accurate: these are not-very-skilful or difficult design tasks, or design outcomes, but also not without value. Also, it should be noted that 11 uses “just” quite a lot.

GL “So you’re…drawing things you like and you’ve noticed…because you think “I might use that one time” or…?”

11 “Yeah, well further on there is a, well I have used it again…” I wonder if this statement demonstrates having an overview of his/her design process? The respondent is telling me about something she knows will come up again later. She seems to me to have stepped back from simply describing what is on the page and be telling me about a wider agenda.

The phrase 11 turns a page in her sketchbook… suggests respondent 11 may have seen herself as being ‘in the driving seat.’

5. [11 turns a page to reveal 4 photocopies of maps of Old Portsmouth. There is also a paper coaster used, I think, as a reminder of work to be done. This reads, *inter alia,* “Map” and “Layers.”] So, we have here copies of maps produced by others: the results of research (in books or online) into the history of the local area. This is not a case of [45] Carries out non-pictorial visuo-spatial research (eg: textual, auditory, interview based…) in support of design ideation because the material is visuo-spatial (it comprises historical maps of the local area). I suspect the sub-category should be [9] Carries out supporting visual pictorial visuo-spatial research in support of design ideation because the analysis of plans showing the development of the surrounding area may be expected to support her design ideation (although it should be noted that there is little evidence of analysis here). That said, I am unsure about the appropriateness here (or maybe anywhere) of [9] Carries out supporting visual pictorial visuo-spatial research in support of design ideation, which could also be applied to 11’s production of perspectives thus far – sketches of items from within Treadgolds used to help her understand the context – but applying it to those design ideation moves would be unhelpful, I think, because this sub-category does not specify paper-based freehand sketches. What am I trying to categorise here? The respondent referred to visuo-spatial material (street maps) produced by others to increase her understanding of the site. Thus, [20] Produces and uses paper-based freehand perspective sketches may be used to explain the characteristics of a spatial design speculation matter to him/herself or others would not be appropriate because she has not produced these street maps herself, and neither would [45] Carries out non-pictorial visuo-spatial research (eg: textual, auditory, interview based…) in support of design ideation because the material is not non-visuo-spatial. The only other time I have used this sub-category is when I was analysing the interview with Respondent 01 as he discussed researching into types of “Pandora’s Box” and produced “1 page of images (and text) which the respondent describes as “…a few pictures…” in order “…to get inspiration…” Respondent 1’s approach of using street maps is, as far as my work is concerned, similar: the plans show the development of the area over the years, and may give inspiration or more
quantitative information (eg: that there is a park nearby, or a church down the road...). So, in conclusion, I regard (9) Carries out supporting visual pictorial visuo-spatial research in support of design ideation as appropriate.

I do not think that the text here ("Map" and "Layers") is worth categorising.

[As soon as she has revealed these pages 11 lifts up the coaster and holds it aloft, without mentioning it. Just before turning the page below, she replaces it on the page.]

11 "...And then this is unfinished work, I've been looking at the layers of the maps and how it's growing, the area..."

The phrase 11 turns a page... suggests respondent 11 may have seen herself as being 'in the driving seat.'

6. [11 turns a page to reveal 2 photocopies of OS maps showing the building location, marked up with circles linked by lines to hand-written words: "Park", "Portsea Library", "Hydrotherapy Centre"]

11 "This is looking at what's in the surrounding area, so...the museum is...here...This is kind of analysing what's in the area." I regard (9) Carries out supporting visual pictorial visuo-spatial research in support of design ideation as once again appropriate here, for the same reasons as discussed above. I wonder if the sub-category (45) Carries out non-pictorial visuo-spatial (eg: textual, auditory, interview based...) in support of design ideation is also necessary to identify the use of another kind of research: what I would understand as a visual 'mapping' of the vicinity? The respondent's words offer no evidence that she has been doing that. What she says ("This is looking at what's in the surrounding area, so...the museum is...here...This is kind of analysing what's in the area.") suggests that this may be a map-focused activity. However, I suspect that some of the things she has identified (eg: "Veterans Outreach Support" and "Venture Playground") may not be shown on the map but be identified as a result of an on-site investigation, so I will keep (45) Carries out non-pictorial visuo-spatial research (eg: textual, auditory, interview based...) in support of design ideation.

GL "What's there, so by now you've visited the museum?"

11 "Yeah."

GL "As...the first visit?"

11 "Yeah, well yeah, there's pictures coming shortly!"

GL "And now you're trying to find out...so it says there, there's library, hypnotherapy...maritime club, okay...playing fields, thank you."

The phrase 11 turns a page... suggests respondent 11 may have seen herself as being 'in the driving seat.'

7. 11 "This is just, I made a Sketch-Up, just looking at the building and trying to understand the space, looking at the routes in the area, it's all [inaudible 00:03:31 – I think "unfinished"], it's not [inaudible 00:03:32 – I think "up to date"]. [11 has turned a page to reveal 1 CAD perspective of the building minus its roof, entitled 'Site Analysis' and marked with a north point and possibly a sun path (although it is incorrect if it is), plus two decorative arrows seeming to mark building entrances. There is also 1 location plan (produced by another, I think) with 2 sheets of tracing paper over it, 1 marked with major road routes and the site location and the other 1 unclear.] This statement suggests certain possibilities: [30] Uses CAD software to produce computer-based 3D drawings may be used to explain the characteristics of a spatial design speculation matter to him/herself or others, [9] Carries out supporting visual pictorial visuo-spatial research in support of design ideation and [21] Produces and uses paper-based freehand plan sketches may be used to explain the characteristics of a spatial design speculation matter to him/herself or others. There are also
some paper coasters used, I think, as reminders of work to be done, but I cannot read what is written on them and so have not categorised them.

Does the use of “just” in “This is just, I made a Sketch-Up, just looking at the building and trying to understand the space…” indicate the use of dismissive language? Why might someone use that word in such a context? As I have argued before, I suspect this is a case of speaking accurately about a preliminary stage in the process, a bit like me saying, “I’m just reading Hensel’s ‘Finding Exotic Form – an Evolution of Form Finding as Method’ (2004) and just need to make notes on it concerning materiality before going onto discuss this material in my draft paper.” I would regard the reading and note-taking as being preliminary steps – important, but not that difficult: what comes next (the discussion) would be more tricky and lead to new concepts from me. Thus, I may say “just” but not as a way of dismissing these preliminary tasks as unimportant or without value.

The phrase 11 has turned a page to reveal 1 CAD perspective of the building… suggests respondent 11 may have seen herself as being ‘in the driving seat.’

8. 11 “And again that is looking at area, [11 turns a page to reveal 1 “site block plan (at 1:200)”, hand drawn with straight edges and colour-rendered (meaning/s of colours not absolutely clear: what appear to be building footprints and back yards have been colour coded with darker and lighter shades of blue respectively; an area behind these buildings has been marked out in grey and orange – probably the footprint of Treadgolds museum; and three plots have been marked in green – front gardens, perhaps, or maybe commercial units?) plus 1 paper-based freehand perspective sketch of a building exterior] that’s just a [11 waves her hand over both pages in her sketchbook, left-hand page, then right-hand page] drawing of the building that’s opposite.” The respondent is showcasing 1 paper-based non-freehand plan (ie: drawn with straight-edges) here – thus [40] Produces and uses paper-based plan drawings, hand-drawn using a straight edge, to explain dimensional information on a spatial design speculation matter to him/herself or others – and 1 paper-based freehand sketch perspective of the exterior of one of the buildings shown on that plan (identified with diagonal lines) – thus [20] Produces and uses paper-based freehand perspective sketches to explain the characteristics of a spatial design speculation matter to him/herself or others: both drawings appearing to show information on what is existing. Am I sure that the plan does show dimensional information? Well, it is to scale “(…1:200)”. But there appears to be more information on it than that: what appear to be building footprints and back yards have been colour coded with darker and lighter shades of blue respectively; an area behind these buildings has been marked out in grey and orange – probably the footprint of Treadgolds museum; and three plots have been marked in green – front gardens, perhaps, or maybe commercial units? Overall, I suspect the function of this drawing is mostly to show the footprint of the site and its neighbouring spaces/buildings to scale, so [40] Produces and uses paper-based plan drawings, hand-drawn using a straight edge, to explain dimensional information on a spatial design speculation matter to him/herself or others is valid, but there appears also to be some basic information on land use. Does this need to be categorised? I think so, yes: [53] Produces and uses paper-based plan drawings, hand-drawn using a straight edge, to explain land-use information concerning a spatial design speculation matter to him/herself or others, perhaps?

It should perhaps be noted that this page appears to contain a space for written notes to be added later, but only the horizontal guide lines have been added. That said, this respondent seems to leave her sketchbook pages “unfinished” quite frequently. This will be discussed below, so I will leave further thoughts about it for now.

I do not regard the use of “just” in the phrase “…that’s just a drawing of the building that’s opposite” as dismissive because of the reasons given in earlier discussions.

The phrase 11 turns a page to reveal 1 “site block plan (at 1:200)…” suggests respondent 11 may have seen herself as being ‘in the driving seat.’

9. GL “…So this is a more detailed version of…what you showed a few pages ago, and then what have we got here?”
11 “This is [11 points to the right-hand page, apparently in response to GL’s question]…what used to be a warehouse that’s opposite the museum but now it’s been turned into flats…so it’s already being reused. It’s unfinished as well [11 means the sketch].” [11 turns a page, apparently unprompted by GL, but then turns it back when GL says…]

GL “…You mentioned that a couple of times, is that meaning you’re going to go back and finish these…?”

11 “…Yeah, it’s because it’s…not a finished project yet so it’s still…”

[11 appears to be about to turn the page, then retracts her hand quickly when GL says the following.] GL “…Is that partly because you’ve got more to tell us in these drawings…”

GL “…Is that partly because you’ve got more to tell us in these drawings…”

11 “Yeah.”

GL “…or because you just want the page to look more finished or…?”

11 “I find that I prefer it when there’s already something on the page and then I can then go back to it, just add in the little bits…so I like to layout and then it gives me time to think about it more and then go back and…add to what I’ve already done.” This is interesting. It seems to reveal that the respondent has an overview of her ideation process: “I find that I prefer it when there’s already something on the page and then I can then go back to it, just add in the little bits…so I like to layout and then it gives me time to think about it more and then go back and…add to what I’ve already done.” She is not just doing the designing, she’s developed a method that she believes works for her. Hence: [38] Demonstrates having an overview of his/her design process.

GL “You’ve got text there as well…can you summarise some of the things that says?”

11 “…It’s just showing all the dates that the things, that…the building has…changed, so for example [11 is pointing to the paper-based freehand sketch elevation of the building] this was built, it was two-storey and now it’s one-storey…this was built [11 is pointing to the paper-based freehand sketch elevation of the building]…with a passageway underneath and now there’s not…this was initially [11 is pointing to the paper-based freehand sketch elevation of the building] two storeys… but became three…and it was extended and this [11 is pointing to the paper-based freehand sketch elevation of the building] was added and there were bits added at the back…so…”

GL “So you’re documenting that here, you’re drawing it here. Okay, please keep going.”
11 “That’s just 11 points to the perspective sketch of the building] another drawing of the exterior… it’s just a quick sketch and then…” Does this use of “…just another… just a quick sketch…” indicate a dismissive reference to this use of an ideation tool? I think not.

The moves 11 is pointing to the paper-based freehand sketch elevation of the building and 11 points to the perspective sketch of the building prompt the question, why did 11 choose to point at these moments?

11 “…[11 turns a page (more of a flap, really) to reveal 1 paper-based section through the building created using needle and thread to show basic outlines, marked-up with broken lines and with certain dividing walls highlighted] there’s something that we did in uni which was looking at seaming together, looking at seaming together for the layers of history and how they go back.”

GL “Why did you approach it that way?”

11 “It was just the way that we…were asked…it wasn’t mine…”

This sounds like a case of [29] Is being guided by previous educational experiences internal educational experiences: “…we…were asked…it wasn’t mine…”

Also, the use of needle and thread with which to ‘draw’ is interesting. This “…seaming together for the layers of history…” may deemed be a form of paper-based freehand sketching, but I’m not sure I would agree that it is. At the very least, it lacks the speed and flexibility of paper-based freehand sketching – indeed, it may be as slow and fiddly as sketch model-making, but it is two-dimensional (so the materiality/physicality of the thread seems to offer no benefits). What might this method offer? Its slowness might encourage reflection on the content (in this case, the section through the building) and stress a link between the different parts of the building; and the different approach to mark-making might encourage the creation of different marks leading to different design ideas (although I don’t think it has in this case – I suspect the respondent has not found this approach helpful (”…there’s something that we did in uni…we…were asked…it wasn’t mine…”)). I doubt any other of my respondents has used this method, so it may not be helpful for me to categorise it as a distinct method.

But, if I did, it would be: [55] Uses an experimental mark-making technique to explain the characteristics of a spatial design speculation matter to him/herself or others.

The phrase 11 turns a page (more of a flap, really)... suggests respondent 11 may again have seen herself as being ‘in the driving seat.’

12. GL “So the approach up to date, is that something that you do which is mostly drawing based, there’s a whole range of drawing, some perspectives, some diagrams, some plan drawings, other things…is that your way of working or is that a way of working that you’re taught?… Or both?”

11 “…I’m not sure, that’s the way I like to work. I like to draw out everything that I see and then kind of get the feel…like I like to draw concepts and stuff… I don’t know, I’m not sure if everyone does it like this…” I wonder what, if anything, needs to be categorised here?

“…that’s the way I like to work, I like to draw out everything that I see and then kind of get the feel…like I like to draw concepts and stuff…” suggests a high level of overall understanding and confidence to me, and I should remember this regarding the dimensions identified up to now. The respondent is not necessarily saying that she understands every part of every ideation tool she has used, but there is an indication that overall she feels she knows what to do (I have noted this on the table of categories and sub-categories).

GL “…So you’re not aware that this is a kind of standard process. It works for you?”

11 “Yeah.”

GL “…Did this do anything for you [GL is pointing to the needle-and-thread section]? Once you’d done this?”
11 "...Well we did this before I'd even seen the building...so I wish I'd have done it afterwards...I didn't understand the building so well when I first did this..."

13. [11 turns a page to reveal 4 sections (copies of drawings by others, I think) plus a mysterious collection of marks – lines, triangles, broken lines and squiggles. I think that these marks are perhaps on the reverse of the needle-and-thread page and do not need to be categorised.] The 4 sections may be hand-drawn with a straight-edge or drawn using a CAD package. They may also have been drawn by someone else. Not knowing which of these is correct, I cannot categorise the drawings.

11 "This is just sections..." [11 turns a page to reveal 1 page with a lot of single-spaced word-processed text (research into the building, I suspect) plus 1 photograph of the building plus 1 timeline ("1700...1800...1900") showing changes to the building summarised in text and a number of small paper-based freehand diagrams showing the street elevation of the building, plus (hidden beneath a flap) another copy of the CAD perspective of the building minus its roof tabled earlier (but now with the north point shown pointing in the opposite direction), plus a coaster with text on it: "Stick in plans w/ colour of interventions"]

Again, I wonder if 'just' is used dismissively here? I suspect the respondent is being accurate inasmuch as, on that page, there are "just" four sections and she has little she wants to say about them, so

The phrase 11 turns a page to reveal 4 sections... suggests respondent 11 may again have seen herself as being 'in the driving seat.'

14. 11 [11 lifts up a flap containing the word-processed text, to reveal the CAD perspective underneath it] a timeline looking at the, again the interventions that...were made in the building...[11 moves the coaster slightly] so using diagrams and stuff [11 points to the timeline] [inaudible 00:07:16 – I think "so kind of doing the time"];] These pages are packed with sub-categories, I think: [45] Carries out non-pictorial visuo-spatial research (eg: textual, auditory, interview based...) in support of design ideation (1 page with a lot of single-spaced word-processed text (research into the building, I suspect) plus 1 timeline ("1700...1800...1900") showing changes to the building summarised in text); [22] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others (1 photograph of the building); [54] Produces and uses paper-based sketch diagrams to explain aspects of characteristics of a spatial design speculation matter to him/herself or others (a number of small paper-based freehand diagrams showing the street elevation of the building); [30] Produces and uses computer-based 3D drawings may be used to explain the characteristics of a spatial design speculation matter to him/herself or others (another copy of the CAD perspective of the building minus its roof tabled earlier (but now with the north point shown pointing in the opposite direction)). The coaster does not need to be categorised, I think, because it is being used as a reminder of a job to be done ("Stick in plans w/ colour of interventions") rather than a way of expressing research information. It may, however, be seen as another component of the respondent's 'confident and well-understood' ideation method.

The phrase 11 points to the timeline suggests respondent 11 may again have seen herself as being 'in the driving seat.'

[11 folds down the flap she had lifted a few moments ago, then turns another page to reveal 1 set of 4 layered paper-based freehand bubble diagrams showing arrangements of bigger and smaller rectangles – layout options for the plan of the building – underpinned by a tartan grid laid on a plan of the building (drawn by the respondent, I think) and 1 set of 3 layered paper-based freehand bubble diagrams showing arrangements of bigger and smaller rectangles – layout options for the plan of the building – underpinned by a tartan grid laid on a plan of the building (drawn by the respondent, I think).]

15. 11 "And then this is kind of looking at the [11 begins leafing through the layered sheets on the left-hand page, then drops them without discussing any sketch in particular], I've got plans underneath, I've got to trace over...looking at the different spaces I have to work with and
because it’s quite a complicated building [11 picks up the layered sheets on the left-hand page, then points to the plan of the building] and the structures…so it’s just breaking the spaces up to see what kind of areas [inaudible 00:07:36 – I think “like using a grid”] seeing what kind of areas they were [11 begins leafing through the layered sheets on the left-hand page again]."

GL “…And the layers mean what?”

11 [11 begins leafing through the layered sheets on the right-hand page] It’s just different…like different methods of like breaking the spaces up [11 drops the layered sheets without discussing any sketch in particular].”

GL “So we’ve got the big space, the nearly quite, not quite so big, that could then be divided into two…you’ve got a space in between so there is a basic structure that you’re beginning to explore possibilities?”

11 “Yeah.”

GL “…And you don’t have any idea of a plan yet…?

11 “No, no, this is just…”

GL “…You’re…analysing?”

11 “Yeah, I’m analysing the building…structure…”

The above discussion brings us to design speculation for perhaps the first time: [33] Produces and uses paper-based freehand sketch diagrams to ask (and attempt to answer) questions about space planning concerning his/her design proposals and [21] Produces and uses paper-based freehand plan sketches may be used to explain the characteristics of a spatial design speculation matter to him/herself or others.

Does the “just” in “…it’s just breaking the spaces up…”, “It’s just different…” and “…this is just…” indicate the use of dismissive language? Why would I say “just” in this context? If I said, “…it’s just breaking the spaces up to see…It’s just different…like different methods of breaking the spaces up.” about those diagrams it would be because I wanted the interviewer to understand that the diagrams had a specific function: they were only exploring the break-up of spaces, but merely exploring this. The respondent may, of course, have been indicating that she did not think this task important, but I see no evidence of that (she appears to have done the work with care and quite thoroughly).

The phrase 11 turns another page to reveal 1 set of 4 layered paper-based freehand bubble diagrams… suggests respondent 11 may again have seen herself as being ‘in the driving seat.’

16. 11 “And then…[11 turns a page to reveal 6 (maybe more – I can’t be sure) photographs of a site model made out of laser-cut MDF (I think) plus 1 paper-based freehand sketch perspective of the building] this was a group site model that we made…just looking at the area…” There is a lot here, I think. I am not sure that I want to categorise the photographs of the site model (because I see no evidence that the photographs are being used in a particular way), but I do wish to categorise the site model: [56] Produces and uses one or more physical model/s may be used to explain the characteristics of a spatial design speculation matter to him/herself or others.

The phrase 11 turns a page to reveal 6 (maybe more – I can’t be sure) photographs… suggests respondent 11 may again have seen herself as being ‘in the driving seat.’

11 “[11 turns another page – more of a flap in the sketchbook, perhaps – to reveal 1 more paper-based freehand sketch perspective of the building]…and these are some sketches that I did try and work out what to do.” I wish to categorise the perspective sketches of the
building: [20] Produces and uses paper-based freehand perspective sketches may be used to explain the characteristics of a spatial design speculation matter to him/herself or others.

The phrase 11 turns another page – more of a flap in the sketchbook, perhaps… suggests respondent 11 may again have seen herself as being ‘in the driving seat.’

11 “[11 turns another page, passing – and possibly pausing in front of – another photograph, but not explaining/discussing it…][11 turns another page to reveal 1 photograph of an old, battered brick wall, plus 2 watercolour rendered elevations showing brickwork (plus word-processed labels with text too small for me to read, plus a sheet of tracing paper with nothing marked on it) and (I think) corrugated iron, plus 1 photograph of timber joinery] And then at the start, we went to visit [11 lifts the photograph (which is on a flap) to reveal the sketch underneath] I'm not really that happy with this [I'm not really that happy with this] [11 is gesturing to the watercolour rendered elevation showing brickwork, and then drops the flap she had lifted] but it's kind of…looking at the materiality, like the materials…within the building.” This sounds like a case of [22] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others.

Also: [57] Produces and uses paper-based freehand elevation sketches may be used to explain the characteristics of a spatial design matter to him/herself or others. I do not intend to categorise the text because I cannot read what it says (but see below where and why I change my mind about this), nor to categorise the tracing paper because it contains no marks so I cannot tell why it is there. However, these decisions seem tricky to me: there appears to be more happening on these sketchbook pages than I can understand (again, see comment below).

GL “So textures, exposed very old brickwork…”

11 “Yeah, it’s really old, I mean some of the stuff inside used…17th Century…ship…timbers, quite industrial when you go inside.”

GL “And… you say you’re not very happy with this, what would make you happier with it?”

The phrase 11 turns another page to reveal 1 photograph of an old, battered brick wall… suggests respondent 11 may again have seen herself as being ‘in the driving seat.’

11 “…I don’t know, to layer stuff, I probably should have layered some more [inaudible 00:09:00 – sounds like “humous” but can’t be] underneath the trace…maybe not stuck that image there [11 is pointing to the photograph of timber joinery]…[I will add some text later on, when I come back to it…” Why might this respondent be saying this? Why might I say this about such sketchbook work? I think I would be “not very happy” because the pages contain less information than is helpful, and the photograph of timber joinery is perhaps not relevant (I’m not sure that it comes from Treadgold’s museum): the pages therefore are not as successful as they might be, and need me to “…add some text later on…” But this would show Understanding, and, perhaps, Confidence, not a lack of it. It may also indicate a reflective approach – [19] Provides evidence that s/he is changing and developing as a designer reflecting on his/her design ideation work – and a negative outcome [52] Mentions making exciting design discoveries having a negative experience surprise through his/her ideation activities design speculations.

The move 11 is pointing to the photograph of timber joinery prompts me to ask why respondent 11 chose to point to this photograph at this moment.

[11’s sketchbook has a number of pages that contain smaller pages that fold in like flaps, making a more layered, interactive and connected sketchbook.] Noted. When I consider the dimension of Connectedness I think this flap approach is a very particularly version of that – I mean particular to this respondent – so I have noted it on the tabulated results. The different ideation tools are literally connected by way of these flaps, allowing more than one method/source of information to be seen (or at least glimpsed) at the same time.
Also, I find that I can now read some of the text: “reused C17 ships timbers”, “brick houses”, “Welsh slate hipped roof” and “…headers”: descriptive information on the construction of the existing buildings: “…looking at the materiality, like the materials…within the building.” Thus: [45] Carries out non-pictorial visuo-spatial research (eg: textual, auditory, interview based…) in support of design ideation.

17. GL “…And that coming back, you were telling me that that's a thinking thing, it's not just making it look better, it's you come back because you've…given it a chance to kind of…”

11 “Settle down…” More, here, relating to [19] Provides evidence that s/he is changing and developing as a designer reflecting on his/her design ideation work, I think: the respondent is showing thoughtful awareness of her design process.

18. [11 turns a page to reveal 1 photograph of (I think – see my translation of the respondent's comment below: “Yeah, of the interior”) the interior of the museum showing a multitude of iron artefacts, plus 1 abstract watercolour showing black marks (I suspect inspired by the iron artefacts), plus written text stating the name “Leonardo Drew.”]

11 “So then this is also inside the building [11 taps the photograph of the building interior with her hand] and…[11 lifts up the abstract watercolour] then this is an artist, Leonardo Drew [11 has revealed 1 photograph of a Leonardo Drew installation that, arguably, has some of the same qualities as the ironwork and abstract painting already discussed. 11 points to the photograph]. I really liked that [11 points to the photograph again] because I thought it kind of matched well [11 points to the adjacent photograph of the building interior] with the stuff that was inside.” [11 has lifted up the abstract watercolour to show 1 page of paper-based pencil sketches of the iron artefacts.] Although it may not seem it to begin with, the above discussion sounds to me rather richly packed. The respondent has included 1 photograph of the building interior ([22] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others) but it is quite an ‘atmospheric’ photograph and may, instead of documenting what is there, be a speculative look towards a quality of space, colour, materiality and light that might be worth including in the final design. There is also an abstract watercolour – perhaps the very first ‘design sketch’, but it is not a sketch perspective or plan, not a collage, not a model but something not seen before during my research: [58] Creates and uses painting/s experimentally to develop investigate design ideas, perhaps). There is also text-based research – albeit only 2 words: “Leonardo Drew”; [45] Carries out non-pictorial visuo-spatial research (eg: textual, auditory, interview based…) in support of design ideation, a photograph of an installation by Leonardo Drew: [9] Carries out supporting visual pictorial visuo-spatial research in support of design ideation, and – under a flap – another sketch (visual research: [20] Produces and uses paper-based freehand perspective sketches may be used to explain the characteristics of a spatial design speculation matter to him/herself or others).

The moves 11 turns a page to reveal 1 photograph…11 has revealed 1 photograph of a Leonardo Drew installation and 11 has moved the abstract watercolour suggest that 11 felt ‘in the driving seat’ here.

GL “…How did you find this artist?”

11 “Just Google. I love like…installations…art…sculptures…and things so I kind of use that [inaudible 00:09:51 – “inspire my work”, I think] quite a lot.”

GL “So you've done some research that’s broader now…bringing that into it…”

11 “Yeah.” Does the “just” in “Just Google” indicate a dismissive comment? It might do. If, when asked where I tracked down, say, a research paper, I said “just Google,” I would perhaps be saying a little sheepishly, as if I was admitting I’d been a bit lazy. But is this tiny example of a dismissive comment about her design methodology worth categorising? Yes! If only to note how rare it is! Thus: [7] Appears to be using dismissive words and phrases to describe his/her paper-based freehand design development sketches design ideation tools.
19. GL “And then we have a photograph...” [GL points to the photograph of the building interior, and then 11 points to the same photograph.]

11 [inaudible 00:09:59 – I think “Yeah, of the interior”]
GL “...Not many photographs in this sketch book.”

11 “There will be more...that will come...”

GL “Yes, it’s not a criticism...Then we’ve got drawings...that look a bit like you’ve started of things on the...?”

Does the above comment by 11 – “There will be more...that will come...” – indicate a case of: [38] Demonstrates having an overview of his/her design process. I think it does, albeit a somewhat modest overview.

11 “…This is the stuff that there is inside and this [11 points to the abstract watercolour] is just rough kind of, wanted to create like a, I don’t know, a weird feeling.”

GL “A response to it.”

The move [11 points to the abstract watercolour] suggests that 11 felt she was ‘in the driving seat’ here.

20. 11 “Yeah...to the objects inside. [11 folds down the flap showing the Leonardo Drew installation and turns the page in her sketchbook... And then here...” These photographs indicate a case of [22] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others. The photographs show elements of the interior of Treadgolds, but also appear to show an emerging aesthetic/concept.

[11 reveals 5 photographs of the museum interior showing old artefacts and a generally brown colour scheme]

The move [11 reveals 5 photographs of the museum interior showing old artefacts and a generally brown colour scheme] suggests that 11 felt she was ‘in the driving seat’ here.

21. GL “…At the moment...where are you in this project here?”

11 “…Still about concept.” Again, this may indicate a case of: [38] Demonstrates having an overview of his/her design process. The respondent is revealing a clear understanding of the stage of design she is in at the moment: concept.

GL “You’re analysing, you’re reflecting on it, okay...”

22. 11 “So this is all stuff that’s inside, these are my pictures of the interior, I’ve started doing...I haven’t finished these again so...[11 turns a page to reveal 2 photographs of the building accompanied by 2 paper-based freehand perspective sketches that show, at a large size, elements also shown in the photographs] I have started doing some sketches of stuff that is there, but I would like to keep that as well...looking back on it now because now I know quite a bit more what I want to do...” This would appear to be a case of [22] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others and [20] Produces and uses paper-based freehand perspective sketches may be used to explain the characteristics of a spatial design speculation matter to him/herself or others. These – especially the latter – are somewhat curious. Why has this respondent produced photographs of a context and then drawn parts of those photographs at a larger size? Why might I do this? Well, drawing a photograph can tell a person more that simply taking the photograph or even looking at it. The respondent has focused on a part of the photograph in each case and drawn it at a larger size. The drawings do not appear to show more detail than the photographs, but perhaps they indicate a wish to

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get to know the item from the photograph more intimately. I could imagine doing this to find out if this item has any capacity to inform my design development. I could also imagine doing it because I was a bit lost but wanted to keep working in case I stumbled on something. Both the more knowing and the more lost approaches would be entirely apposite for the spatial designer.

The move below suggests that 11 felt she was 'in the driving seat' here.

23. [11 turns a page to reveal 1 photograph of the building interior accompanied by 1 paper-based freehand perspective sketch that shows, at a large size but very sketchily, elements also shown in the photograph… (this would appear to be another case of [22] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others and [20] Produces and uses paper-based freehand perspective sketches may be used to explain the characteristics of a spatial design speculation matter to him/herself or others)…

This move (11 turns a page to reveal 1 photograph of the building interior…) suggests that 11 felt she was 'in the driving seat' here.

24. …and 11 then immediately turns the page to reveal 1 paper-based freehand sketch section showing a rooftop ([59] Produces and uses paper-based freehand section sketches may be used to explain the characteristics of a spatial design speculation matter to him/herself or others), 1 photograph showing an interior view of a large rooftop ([22] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others), and 1 paper-based freehand sketch perspective, watercolour rendered, with a sheet of tracing paper laid over it ([20] Produces and uses paper-based freehand perspective sketches may be used to explain the characteristics of a spatial design speculation matter to him/herself or others). There is also 1 coaster containing the words, “add pic of metal roof” ([45] Carries out non-pictorial visuo-spatial research (eg: textual, auditory, interview based…) in support of design ideation). This last sub-category is a tricky one. Is a coaster containing the words, “add pic of metal roof” a design ideation tool? Only in a broad sense – it helps the respondent remember a job to do to complete her sketchbook, which may help her do a better job of designing the building interior – but in no other sense, I suspect.

This move (…and 11 then immediately turns the page to reveal 1 paper-based freehand sketch section…) suggests that 11 felt she was ‘in the driving seat’ here.

25. 11 “So then this is just the structure, the space…the lines…the window at the top.”

GL “…That’s an image that makes me ask did you come here already having a…skill at drawing and painting?”

11 “Well…I initially applied…here to do television and film production and then I had a year out, ‘cos I love drawing so much, it was like ‘I want to do something where I can actually use that’…I did art for A Level as well so it kind of led from there…So that’s just…More unfinished pages [11 turns a page to reveal 1 photograph of a covered courtyard in the building, plus 1 paper-based freehand perspective sketch (quite sketchy)...(a case of [22] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others, I think, plus [20] Produces and uses paper-based freehand perspective sketches may be used to explain the characteristics of a spatial design speculation matter to him/herself or others)…then another page to reveal 3 photographs of the building interior…(another case of [22] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others)…then another to reveal 1 photograph of the building interior, plus 1 paper-based freehand perspective sketch (quite sketchy) (another case of [22] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others)…and then here the structure…” 11 turns a page to reveal 4 more
photographs of the building interior plus handwritten text: “18th C staircase” (another case of [22] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others plus ([45] Carries out non-pictorial visuo-spatial research (eg: textual, auditory, interview based...) in support of design ideation).

These moves (11 turns a page to reveal 1 photograph of a covered courtyard...then another page to reveal 3 photographs of the building interior11 turns a page to reveal 4 more photographs of the building interior) suggest that 11 felt she was ‘in the driving seat’ here.

26. GL “Now, the photographs...what job are they doing in this sketchbook? [11 begins to leaf back through her sketchbook to reveal 3 photographs of the building interior, and then to reveal 1 photograph of the building interior, plus 1 paper-based freehand perspective sketch (quite sketchy).]

11 “I just wanted to show the space, the things that initial, that massive space at the back, just kind of show its...”

GL “…Why didn’t you draw it? Again not a criticism, it’s a question…”

11 “…I guess it’s easier, when you have a photograph...just draw it from that, I think when we were in there as well, we didn’t really have...much time.”

GL “So it’s a shortcut to get...some information but then you carry on with the drawing?”

11 “Yeah.”

GL “What does the drawing give you that the photograph doesn’t?”

11 “It gives me more of a depth I guess, a photograph I find is quite hard to catch, like get the whole kind of, because it’s quite limited sometimes...to understand. I mean there is an app on the iPhone now which is you can do panorama...which is quite good I find...when I'm trying to understand a building because...I can see the depth of it.”

27. 11 [11 turns several pages in her sketchbook... “That’s just...”...to reveal 2 images of the building interior. Most of the photographs seen thus far show ironwork or material textures. The first image here shows 1 layered collage of images previously seen: photographs of the rooflight and brickwork textures, and paper-based perspective sketches of the ironwork. The second shows another photograph of the iron tools once made in Treadgolds, hanging on a white wall.] As the phrase ‘That’s just...’ tails off, I feel disinclined to consider whether or not it is an example of a dismissive use of words because there is a lack of evidence.

GL “There’s still hardly any words.”

11 “Yeah, I know, that comes later...”

GL “Yeah, you know, I’m really interested because...other places as a student, it’s words, words, words...hardly any drawings, you come here and it’s...”

11 “…[11 laughs] All images.”

GL “But, you know, there’s plenty of thinking going on as well...”

These moves (11 begins to leaf back through her sketchbook...11 turns several pages in her sketchbook...) suggest that 11 felt she was ‘in the driving seat’ here.

The phrase “…that comes later...” suggests that this discussion is another indication of [38] Demonstrates having an overview of his/her design process.
28. “...This [11 points to the photograph that shows 1 layered collage of images previously seen: photographs of the rooflight and brickwork textures, and paper-based perspective sketches of the ironwork] is something that I made which is like a [11 waves her hand over the left-hand page, then the right-hand page] [inaudible 00:13:16 – I think “palimpsest”]…and then you've got the [11 points to various parts of the collage as though trying to highlight certain parts of it as she described it] window and then there’s that initial sketch from the beginning...just kind of layering [11 gestures as though – I think – trying to indicate “layering”] different textures that I found in the space and then that’s [11 gestures to the photograph] another photograph taken of the objects inside.” This is interesting. I believe the sub-category regarding this first image is [12] Produces and uses collage to develop investigate design ideas.

There is quite a lot here. This respondent appears to be layering photographs and previously produced sketches creatively, as an ideation tool, to increase her understanding of the building perhaps, or maybe to stimulate design ideas (both of which may add up to the same thing). She mentions (or appears to mention) “palimpsest” – from my experience, something of a preoccupation of the tutors at her University – but does not explain what that word means. She says briefly why she used it (“...just kind of layering different textures that I found in the space...”) but not how useful the outcomes were. She provides no verbal comment beyond “…This is something that I made...then you've got the window and then there’s that initial sketch from the beginning...just kind of layering different textures that I found in the space...”, and there is no explanatory text. However, I am minded to see this palimpsest as an investigation of design possibilities beyond what the building looks like to what those ingredients might help it to become. But is this collection of photographic and sketched images one ‘image’ or several? I choose to see it as a single image (a palimpsest), not a series of images, and therefore a kind of collage. So, not [22] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others and [20] Produces and uses paper-based freehand perspective sketches may be used to explain the characteristics of a spatial design speculation matter to him/herself or others but [12] Produces and uses collage to develop investigate design ideas.

In the second image, there is less evidence of this ideational approach. It shows another view of the iron tools once made in Treadgolds, hanging on a white wall. It is quite a striking photograph and may have some ideational function, but there is much less evidence of the intervention of the student. I think this is a clear case of [22] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others.

The moves 11 points to the photograph... and 11 gestures to the photograph... prompt me to ask why 11 thought she ought to do those things here.

29. [11 turns a page to reveal 6 photographs of the building interior, all showing either ironwork, materials or furniture. There are other photographs -- loose ones -- laid onto the page.]

11 “And this is more [11 waves her hand over the left-hand page then picks up a pile of loose photographs from the right-hand page, holding them aloft] looking at materiality, of the interior, these [11 returns the pile of photographs to the right-hand page in batches] are the [inaudible 00:13:34] go inside and take a picture [11 picks up the loose photographs again, and then puts them down again].” This seems to be another case of [22] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others.

GL “Do you feel you’re getting somewhere at this point? Are you...gradually understanding...?”

11 “Yeah, I'm starting to understand, I think especially [11 flicks -- somewhat vaguely, I think -- back through her sketchbook, discussing nothing revealed, and then returns to the pages currently being discussed] doing the...timeline and looking at the layers...I found that helped so much...to understand, like the shape of the building...and then going like for a second visit after doing that...kind of...really helped me to...understand it.”
GL “Right.”

The move 11 turns a page to reveal 6 photographs of the building interior… suggests that 11 felt she was ‘in the driving seat’ here.

30. [11 turns a page to reveal 3 photographs of a sketch model of the existing building.]

11 “And then… so I made a rough sketch model… [11 gestures to the empty paper next to the third photograph] there would be stuff there and then [11 turns a page to reveal 2 photographs of a different sketch model of the existing building] this was a group model that we made [11 waves her hand over 1 of the photographs] of the whole building… looking at the spaces [11 turns a page to reveal 4 photographs of interior spaces in that sketch model]. looking at different views inside…

GL “Why… were you asked to make a group model and you made your own model?”

11 “…The group model was our choice, we decided to do it all together because…it’s such a complicated building… we felt… it would be easier if we all worked together… This sketch model [11 lifts up the preceding page and taps the photograph sketch model that is visible] was just something that I did…”

GL “And… why did you do it?”

11 “…Just to try and help me understand it… but then all of these different kind of making models and drawings and making it on Sketch Up, it… has all added together… helped me analyse the structure.”

These seem to add up to a case of [56] Produces and uses one or more physical model/s may be used to explain the characteristics of a spatial design speculation matter to him/herself or others. The photographs show the models but do not show how the models have been or are being used. 11’s comment above indicates a general aim to understand the structure: “…Just to try and help me understand it… but then all of these different kind of making models and drawings and making it on Sketch Up, it… has all added together… helped me analyse the structure.” Also, the four interior views provide what may be called a ‘sense of space’: views through openings, a feeling of ceiling height and spatial width/depth. The model this respondent made herself – quite roughly, I would argue – was built out of grey card on white base board; the group model appears to have been built out of foamboard on black baseboard, to show more detail (windows, upper floors and roof slopes) and to have been made with more care. Both models are without roofs. Why two models? Perhaps the ‘scruffier’ one – her own – helped this respondent to work more freely?

The moves 11 turns a page to reveal 3 photographs of a sketch model… 11 turns a page to reveal 2 photographs of a different sketch model… and 11 turns a page to reveal 4 photographs of interior spaces in that sketch model suggest that 11 felt she was ‘in the driving seat’ here.

The move 11 gestures to the empty paper next to the third photograph prompts me to ask why 11 thought she ought to gesture here.

31. GL “…Can you give me a sense, where are we in terms of the timeline of this project? Are we a week in or five weeks…?”

11 “We’ve only been working on it since January so… it’s just from there until now, this is probably… I’d say about three weeks ago.”

GL “Three… weeks ago so…”

11 “…A month and a half in… [11 turns a page to reveal 2 photographs of interior spaces in the group sketch model] See this is just more images...”
Is the word “just” in “…just to try and help me understand it…”, “This sketch model was just something that I did...” and “…just more images…” used dismissively? I suspect the first is not: if I used that word I think I would be saying, “I’m not designing here, not being creative, just trying to understand the context; the task is prosaic, not dealing with the ‘magic’ of design.” I suspect the third may not be either: if I used that word there I would again be saying, “I’m not designing here, not being creative, just trying to understand the context.” However, I suspect the second may be slightly dismissive: the model is a poorer model, which the respondent might think needs a “just” to excuse it or contextualise it. If I used the word in that statement, I would be saying, “It’s not a great piece of work, it’s nothing special.” But the power of a sketch model is in how it is used, more than how good it looks. She may be excusing it to me but actually finding it useful herself. So, should I categorise this? On balance, I think so: I think this respondent may be making a significant point here, thus: [7] Appears to be using dismissive words and phrases to describe his/her paper-based freehand design development sketches design ideation tools. But I may rethink later.

The move 11 turns a page to reveal 2 photographs of interior spaces in the group sketch model suggests that 11 felt she was ‘in the driving seat’ here.

32. “…and there [11 turns a page to reveal 1 page of hand-written text (notes on a precedent study, I think, entitled “Documentation Centre in…” and including “uses metal spear to cut through building”, “leads them through the space”, “harsh details & shapes reflect history” and “has exhibition spaces connected in foyer”), plus 1 mysterious paper-based freehand diagram showing a rectangle nesting in another one, both crossed by a shaft of some sort, plus 1 photograph of a bricky, steely precedent study, plus 1 comment on a paper coaster: “all scans from book”] I’m just analysing some precedents…so looking at [inaudible 00:15:42 – I think “ones that keep the”] [11 moves the coaster from the left-hand page to the right-hand page, and points to the photograph on the right-hand page] brickwork…”

The above is a case of [45] Carries out non-pictorial visuo-spatial research (eg: textual, auditory, interview based..) in support of design ideation, [54] Produces and uses paper-based sketch diagrams to explain aspects of characteristics of a spatial design speculation matter to him/herself or others, and [22] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others.

Does the word “just” in “…just analysing some precedents…” indicate that 11 is being dismissive? If I used that word in a similar context what might I mean? As a researcher, “I’m just doing some background reading,” might well mean, “I am doing something necessary and quite interesting but not so very difficult, not leading directly to new knowledge and not so much fun.” As a designer, “I’m just reading about possible roof tiles I could specify,” might well mean, “I’m not dealing with complex design problems, but I’m doing something I need to do although it is not so much fun.” As a research student, “I’m just doing some background reading,” said to my tutor, might well mean, “I’m not dealing with the most tricky problem of analysing my data to determine where to go next, time being short.” All of these suggest that I am doing a more or less “lesser” activity indicating that there might be an element of dismissiveness. Thus: [7] Appears to be using dismissive words and phrases to describe his/her paper-based freehand design development sketches design ideation tools.

The move 11 turns a page to reveal 1 page of hand-written text… suggests that 11 felt she was ‘in the driving seat’ here.

33. “…[11 turns a page to reveal at least 7 photographs (all but 3 of them loose) of the interior of what looks like an old, stone, concrete and steel building that appears to celebrate material textures, with the hand-written label, “Castle Veccio] looking at Castle [inaudible 00:15:43 – I think “Veccio”].…which was [inaudible 00:15:48 – I think “awesome, I love that”] and then just some more precedents [11 turns a page to reveal 1 photograph of a timber and stone building interior, plus hand-written text: the something “Centre - Toledo”, plus 1 comment on a paper coaster: “add scans from book” and [11 turns a page to reveal secondary research material concerning the Tate Modern: 1 axonometric view of the building (the Turbine Hall, I think), plus text concerning the Bankside Power Station, plus photographs of the building interior] I’ve actually put a bit of my dissertation [11 unfolds her dissertation, making it slightly more
visible]…because it kind of relates…to the idea…of…using, reusing…industrial buildings." [It seems that the text referred to above is actually from her dissertation.]

GL "…So you've got the Tate Modern there."

11 "Yeah…Yeah, [11 turns a page to reveal 1 single photograph of the Turbine Hall] because the function that I kind of want to do for this building, from analysing the area [11 lifts up pages in her sketchbook as if about to flick backwards, but does not then do so], [inaudible 00:16:13 – I think "kind want to add"] like an art gallery, a workshop, a community space…where the local area can use."

GL "…What you've just told me…does that appear in your sketchbook [11 begins 'toying with' her dissertation, lifting pages in what seems to me to be a fairly vague way] later? This insight that…you want it to be a certain kind of function…?"

11 "Er, no I haven't [inaudible 00:16:29 – "got that yet" I think]."

GL "…But it's emerging. Had you got there by now then…?"

11 "Yeah, that's why I chose these precedents [11 flicks back through her sketchbook, revealing one, then another precedent already discussed, but returning to the page with the photograph of the Turbine Hall]…because obviously Castle [inaudible 00:16:38 – "Veccio", I think] is a museum…and it's also art gallery [11 gestures to the photograph of the Turbine Hall], and I completed my dissertation on [11 unfolds her dissertation but does not point to any items in it]…reuse of industrial buildings [inaudible 00:16:47], and I completed my dissertation on [11 unfolds her dissertation but does not point to any items in it]...reuse of industrial buildings [inaudible 00:16:47]."

GL "Okay."

[11 turns a page to reveal 3 photographs of building interiors showing almost monochromatic spaces (a bit like the photographs of the site referred to above) with an emphasis on steel, concrete, glass and stone (a bit like the precedent images referred to above), plus 1 comment on a paper coaster: "media centre…burg…um"] And this is just some visual precedents. looking at [11 moves as if to turn the next page, then lowers the page and gestures to the photograph on the right-hand page] materials, the contrast between old and the new."

GL "You were discussing this with your tutor every…week?"

11 "Yeah, yeah…"

This sounds like a case of [22] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others and [45] Carries out non-pictorial visuo-spatial research (eg: textual, auditory, interview based…) in support of design ideation.

The moves 11 turns a page to reveal at least 7 photographs…, 11 turns a page to reveal 1 photograph of a timber and stone building interior…, 11 turns a page to reveal secondary research material concerning the Tate Modern…. 11 turns a page to reveal 1 single photograph of the Turbine Hall… and 11 turns a page to reveal 3 photographs of building interiors showing almost monochromatic spaces… suggest that 11 felt she was 'in the driving seat' here.

34. "…[11 turns a page to reveal a block plan of Old Portsmouth (someone else’s image, I think) plus 3 photographs, 2 on a flap and 1 underneath the flap] And then this is looking at art galleries that are actually within the local area [11 points to the 2 of the photographs on the flap]…so this is one called Round Tower which is in Portsmouth…[11 lifts a flap with 2 of the photographs, revealing the photograph underneath (which she does not mention) then turns a page to reveal 3 more photographs which she then goes onto describe] this is Aspects Gallery…which is also in Portsmouth [11 turns a page to reveal 2 more photographs
which she then goes onto describe]…This was John, I think it was the John Palms [I think "Pound"] Centre maybe…it’s not in Portsmouth…but it’s basically looking at displays…sculpture displays…i’m quite interested in sculptures…just kind of looking at that [11 turns a page, then lifts the loose photographs, revealing what is underneath them. Altogether there are 5 or more precedent photographs, some loose, but does not stop to discuss these or allow a clear view of them] and then…just some more Scarpa stuff…"

This sounds like a case of [22] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others and [9] Carries out supporting visual pictorial visuo-spatial research in support of design ideation. That said, the photographs may not have been produced by 11 – in fact, I doubt many of them were – so they could be better categorised as [9] Carries out supporting visual pictorial visuo-spatial research in support of design ideation along with the block plan.

Do the phrases “…just some more precedents…”, “…just some visual precedents…”, “…just some more Scarpa stuff…” indicate the use of dismissive words? In all cases I suspect the above discussion applies: if I said as a researcher, “I’m just doing some background reading,” might well mean, “I am doing something necessary and quite interesting but not so very difficult, not leading directly to new knowledge and not so much fun.” As a designer, I might well mean, “I’m not dealing with complex design problems, but I’m doing something I need to do although it is not so much fun.” As a research student, I might well mean, “I’m not dealing with the most tricky problem of analysing my data to determine where to go next, time being short.” All of these suggest that I am doing a more or less “lesser” activity indicating that there might be an element of dismissiveness. Thus: [7] Appears to be using dismissive words and phrases to describe his/her paper-based freehand design development sketches design ideation tools.

The moves 11 turns a page to reveal 1 block plan of Old Portsmouth…, 11 turns a page to reveal 3 more photographs…, 11 turns a page to reveal 2 more photographs… and 11 turns a page to reveal 5 or more precedent photographs… suggest that 11 may have seen herself as being ‘in the driving seat’ here.

35. [11 passes two blank pages (well, one has an illegible hand-written statement on it), to reveal 1 mind-map that appears to have the title “Gallery”, plus a number of statements (“display objects from tredgolds – local artists/students – maybe/what?” “flexible”, “space for talk”, “tell a story - narration”, “open yet inclosed spaces”, and “setting the stage for artwork”), plus 2 photographs of a gallery interior, one quite dark and from the same stable (I think) as the photographs discussed above, and one more of a ‘white cube’ interior, plus 1 tiny paper-based freehand sketch perspective diagram showing a “layered space”. The photographs are adhered to a loose page. 11 lifts the page of photographs revealing more of the mind map.]

11 "And then this is kind of looking at what’s needed in the gallery space…” [11 is lifting the right-hand pages as though about to turn it.]

GL "…So we’ve got tiny [11 drops the right-hand page as GL points to it] – because you’re hardly drawing at all now – you’ve got…lots and lots of photographic material, a little sketch there [11 lifts the right-hand page again], layered space maybe."

11 “Yeah, that was…”

This looks like a case of [4] Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals, [33] Produces and uses paper-based freehand sketch diagrams to ask (and attempt to answer) questions about space planning concerning his/her design proposals, and [22] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others.

The moves 11 turns 1 more page to reveal two blank pages (well, one has an illegible hand-written statement on it), then turns 1 more page to reveal 1 mind-map… and 11 returns to the photograph of the ‘white cube’ space… suggest that 11 may have seen herself as being ‘in the driving seat’ here.
The move 11 points to the photograph of the ‘white cube’ space prompts me to ask why she chose to point here.

36. 11 “…Then [11 turns a page to reveal 2 photographs of what look like Le Corbusier’s studio] I haven’t finished this one [11 points to an empty page next to the photographs of Le Corbusier’s studio which contains the word, “Studio”], looking at what should be in the studio space…”

This looks like a case of [4] Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals, and [22] Produces and uses photographs may be used to explain the characteristics of a spatial design speculation matter to him/herself or others.

The move 11 turns a page to reveal 2 photographs of what look like Le Corbusier’s studio suggests that 11 may have seen herself as being ‘in the driving seat’ here.

The move 11 points to an empty page next to the photographs of Le Corbusier’s studio which contains the word, “Studio” prompts me to ask why she chose to point here.

37. “…And then [11 turns a page to reveal, on the left, several layers of paper-based freehand space planning bubble diagrams sketched on tracing paper over a plan of the existing building, plus arrow lines and words (“Shop”, “studios”, “gallery space/shop” etc), plus, on the right, one layer of paper-based freehand space planning diagrams sketched on tracing paper over a plan of the existing building, plus arrows and words (“2nd floor”, “gallery”, “studios”, “gallery space”, “offices” etc). I think I can see 3 diagrams in all kind of working out [11 waves her hand over the left-hand page; GL gasps] where I want to put different things so…I made a list of the…rooms [11 waves her hand over the left-hand page; GL gasps] that… I needed.”

This seems to be a clear case of [33] Produces and uses paper-based freehand sketch diagrams to ask (and attempt to answer) questions about space planning concerning his/her design proposals, [9] Carries out supporting visual pictorial visuo-spatial research in support of design ideation and [4] Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals.

The move 11 turns a page to reveal, on the left, several layers of paper-based freehand space planning bubble diagrams… suggests that 11 may have seen herself as being ‘in the driving seat’ here.

38. GL “And where’s that list, is that elsewhere?”

11 “Yes, it’s somewhere else…actually I think it might be [11 turns a page to reveal 2 paper-based freehand perspective sketches showing ideas for the building interior, one in ink and one in pencil with shading, plus a list of “the rooms that I need”: “gallery”, “café”, “toilet” etc]…it’s on this one…But that’s just sketches that I’ve added in.”

11’s comments “I haven’t finished this one…” and “Yes, it’s [ie: the list’s] somewhere else…actually I think it might be… it’s on this one…” suggest another insight into the difficulties of carrying out research into the challenges of carrying out research involving sketchbooks: what is a sketchbook? It may lack – and later contain – information; it may be insufficiently “finished”.

I shall return to these to categorise them later, when they are revisited during the interview – see 41. below.

39. GL “So now you’re in a place where…you’ve got a concept?”

11 “No, not yet…I’ve just got all the information and now I want to developing…the concept.”
90

[11 has returned to the layered bubble diagrams and space planning diagrams mentioned above.]

GL “Alright, you've got a kind of feeling for this building...haven't you...?”

11 “Yeah.”

GL “You've got a...set of functions...you've got a list of what the spaces maybe...and in you go and you've analysed the building, so in we go now.”

11 “This is just looking at kind of where I want to put things, so obviously because the larger space [11 waves her hand over the left-hand page] is at the back, I wanted to break that up and turn it into the gallery space, then [11 waves her hand over the left-hand page] the [inaudible 18:56] studio's at the back, the café, shop...”

GL “And layered...” [GL lifts up one of the layers of tracing paper to reveal another paper-based freehand space planning bubble diagram, and then another.]

11 “This is just...testing several different ways...”

GL “…Right, working off the existing...right, okay?” [11 lifts up the right-hand sheet, but this may have been because GL had been lifting up the left-hand sheets. 11 then drops the sheet and turns the page.]

Do the phrases “…just looking at kind of where I kinda want to put things...” and “…just...testing several different ways...” indicate the use of dismissive language? Well, in the past, I have argued that the respondent was not being dismissive, or only being slightly dismissive, because she was being accurate about “just” doing non-idea-generational work rather than the more difficult and, perhaps, enjoyable, design. But here she is referring to design work: the use of bubble diagrams to explore “…where...to put things...” I thus find myself feeling puzzled. Perhaps “just” has no specific meaning – perhaps it is an insertion, an habitual word such as “like” in “I was like so tired” or “He was like so confused”. Or perhaps it is an indicator that this respondent is uncomfortable talking about her design ideation sketches: perhaps she thinks I wanted to see lovely finished sketches, rather than these layered bubble diagrams. On balance, I think it may be right to categorise this as [7] Appears to be using dismissive words and phrases to describe his/her paper-based freehand design ideation tools.

The move 11 has returned to the layered bubble diagrams and space planning diagrams mentioned above suggests that 11 may have seen herself as being ‘in the driving seat’ here.

40. 11 “So then from there [11 turns a page to reveal 3 photographs/downloads showing material samples plus another palimpsest image that seems to incorporate images of these samples], I started looking at the materials I kinda wanna to use, [inaudible 00:19:13 – I think “within my insertion”] and then other [11 points to the collage] layers...that I done on Photo Shop.”

GL “…Palimpsest...”

11 “Looking at [11 points to the collage], with the materials and the [inaudible 00:19:22 – I think “existing”] materials that I could see in there.”

This looks like a case of [12] Produces and uses collage to develop investigate design ideas and [9] Carries out supporting visual pictorial visuo-spatial research in support of design ideation.

The move 11 turns a page to reveal 3 photographs/downloads showing material samples... suggests that 11 may have seen herself as being ‘in the driving seat’ here.

41. [11 turns a page to revisit the 2 paper-based freehand perspective sketches showing ideas for the building interior, 1 in ink (rather free in execution) with, perhaps, a chalk
rendering, and 1 in pencil (rather less free in execution) with, perhaps, chalk shading, plus a list of “the rooms that I need”: “gallery”, “café”, “toilet” etc.

11 “…And then, this is just really rough, looking at stuff that I found within the building, there’s lots of…metal, iron.”

This looks like a case of [6] Produces and uses paper-based freehand perspective sketches to ask (and attempt to answer) questions about his/her design proposals and [4] Uses a word-based approach to ask (and attempt to answer) questions about his/her design proposals.

The move 11 turns a page to revisit the 2 paper-based freehand perspective sketches showing ideas for the building interior… suggests that 11 may have seen herself as being ‘in the driving seat’ here.

42. GL “May I ask, at this point are you working in any other mediums…?”
11 “Yeah.”

GL “What else are you doing?”
11 “Oh sorry, no I’m not… I mean I’m using Photo Shop and…then this is just…”

GL “…You don’t have another lot of images or another big sketch book that you’re…using at the same time?”
11 “…Well I work in a different sketchbook and then stick in…my images after organising because otherwise…it all just gets too jumbled and it’s…drawings everywhere, so I have to do it separately and then stick it in and do it…”

11’s statement above seems to me to offer another insight into the challenges of carrying out research into sketchbooks: 11 has “…a different sketchbook…” in which she “…stick[s] in…my images after organising because otherwise…it all just gets too jumbled…” So a sketchbook may not be one item but a number, each having different functions?

GL “…And this is the one where you’re bringing it all together is it?”
11 “Yes, this is just kind of like bringing it together.”

This looks like a case of [38] Demonstrates having an overview of his/her design process because the respondent is providing a larger view of what she does (in response to a question by me). But there is also something here about what a sketchbook is, which I shall return to.

43. 11 “[11 points to the pencil sketch (or perhaps the ink sketch – her gesture does not make this clear)] This is actually from a different unit I think…where we looked at mapping but I think I found it kind of links…with what I was doing anyway.”

The move 11 points to the pencil sketch (or perhaps the ink sketch – her gesture does not make this clear) prompts me to ask why she chose to point here, and at what?

GL “And…it’s quite a small sketchbook…in size, you don’t…?”
11 “Well I do have a big A3 one where I do my perspectives…which I hand draw in usually.”

GL “And have you got that here?”
11 “No…sorry…” [11 laughs.]
GL "...So you've got this and...would you say this is your main sketchbook...for the development work?"

11 "Yes, this is my main one."

GL "Right, we'll keep going then."

11 "Okay, so these are just sketches kind of looking at different ideas [11 appears to be referring to the 2 paper-based freehand perspective sketches showing ideas for the building interior.]"

I have no comments to make on 43. above beyond adding items of the text to Dimensions of previously allocated sub-categories.
Appendix G – Table of categories and sub-categories – sample

This is included to show more completely the researcher’s tabulation of the categories and sub-categories. This is only a sample because the full table comprises three-hundred-and-two pages.

Notes:
So how to display this categorised data? Let’s try this.

Because the sketchbook does not document a complete design journey. When is a difficult dimension to measure.

Consider: what are the sequence of moves, and the frequency of moves, and the kinds of move, at the beginning of a project and at the end of a project?

Consider: what does good work (in my opinion) accompanied by the use of ‘ dismissive’ say about the respondent’s relationship with the work and with me?

<table>
<thead>
<tr>
<th>Respondent 01 (Level 4)</th>
<th>Respondent 07 (Level 6)</th>
<th>Respondent 08 (Level 6)</th>
<th>Respondent 11 (Level 6)</th>
<th>Respondent 13 (Level 6)</th>
<th>Respondent 04 (Level 6)</th>
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<td>[1] Uses a word-based approach to ask (and attempt to answer) questions about further design proposals.</td>
<td>[2] Produces and uses paper-based annotated brainstorm sketches to diagram to ask (and attempt to answer) questions about further design proposals.</td>
<td>[1] Uses a word-based approach to ask (and attempt to answer) questions about further design proposals.</td>
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Size of design move – preliminary thinking about concept, function and layout: 09 "... initial mapping of what I would like my scheme to be... how to help the teachers to be less stressed when they teach in the classrooms, so they can teach more productively and the children can learn." The above diagrams and text indicate
[29] 'Is being guided by educational experiences.

Dimensions: Frequency of influence – too soon to yet known.  

Apparent depth of influence – well, do what was asked to do, but it did with some probity, using an ideation tool with which he was familiar – nor likely high depth, perhaps.

Focus – identifying possible initial design ideas (concepts, perhaps)

Sub Focus – within his/her primary command, that is the word “jumble” does not appear to be using.

Connectedness – not that this is not a jumble, but rather an ideation tool with which he was familiar – nor likely high depth, perhaps.

Understanding, Confidence and Independence

Relate the start of the project as documented in 05’s sketchbooks to the very start of the project as documented in 05’s sketchbooks.

Sub Connectedness – what her values are, and do sort of suggest she is being dismissive. I would not be being dismissive, but rather a reflection on the, something… which was going to make something or design something which was going to be made as a reflection to the past… I was just… it… was in relation to the design something which was going to be made as a reflection to the past… I was just… it… was in relation to the design something which was going to be made as a reflection to the past… I was just… it… was in relation to the design something which was going to be made as a reflection to the past… I was just… it… was in relation to the design something which was going to be made as a reflection to the past… I was just… it… was in relation to the design something which was going to be made as a reflection to the past… I was just… it… was in relation to the design something which was going to be made as a reflection to the past… I was just… it… was in relation to the design something which was going to be made as a reflection to the past… I was just… it… was in relation to the design something which was going to be made as a reflection to the past…
Understanding, Confidence and Independence – do not reveal or discuss all the diagrams. The diagrams I can see now mainly show ways of arranging four or five activities/functions within a circular form, with some diagrams showing a circle with a small wedge removed. The impression I get is that 09 is using this ideation method with confidence and understanding - 09. 09 has not revealed the reason for removing the wedge. The following statements by 09 suggest a lot of understanding of the design context: “…I was thinking about…four key principles so it was…reading, writing, speaking and play, so…those were the four things that primary schools help to develop during that time, so I was just thinking of how I could help to facilitate that”. Plus “…I was just thinking…with the circle, I just thought of lily pads and how…that kind of like…progression…between school years, so I just kind of took that further, just thinking…like connecting bits together…relating it to the environment so I was thinking of valleys and mountains…”, plus “I was relating it to how Michael Gove was like putting out new policies for classroom management and stuff, so just thinking how could I reconcile that so instead of having a brand new interior, how can I kind of link a retro fit, like a fit to standard dimensions of classrooms?”, plus “…classes are quite rigid, they’re just kind of like tables and chairs, so I was just thinking it could make a series of open and closed spaces for you know…so that it’s kind of like the separate kind of the study, sessions on different tables, so that’s where the kind of…circular came in…then…those kind of things and just thinking…to see…like the different areas, so again it’s all folded…conceptual kind of just thinking I could kind of see that…especially with the…primary schools”, plus “…I was just thinking about the mapping of what I would like my scheme to be to help the teachers to be...
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independence

- mind mapping has plenty of experience of a cloud shape comprising words, arrows and shading, a cloud shape to stimulate creativity. Possiblyخيل عليه (It is possible) included in his/her design proposals and then, after the start of the project, dimensions were explored and the range of the design possibilities was not yet known. When less than 2008... GL “Okay… And were you excited at that point? About the Barbican and the project...?” GL “Yeah.”

- word-based approach to ask (and attempt to answer) questions about how the design process is going through... just design development... during that time... I was just thinking of how I was just trying to... just trying to put my train of thought... so just to help me comprehend what exactly I wish to do... so just trying to... just thinking... just thinking how I could I receive that so instead of having a brand new approach to ask (and attempt to answer) questions about how the design process is going through... just design development... during that time... I was just thinking of how I was just trying to... just trying to put my train of thought... so just to help me comprehend what exactly I wish to do... so just trying to... just thinking... just thinking how I could I receive that so instead of having a brand new approach to ask (and attempt to answer) questions about how the design process is going through... just design development... during that time... I was just thinking of how I was just trying to... just trying to put my train of thought... so just to help me comprehend what exactly I wish to do... so just trying to... just thinking... just thinking how I could I receive that so instead of having a brand new approach to ask (and attempt to answer) questions about how the design process is going through... just design development... during that time... I was just thinking of how I was just trying to... just trying to put my train of thought... so just to help me comprehend what exactly I wish to do... so just trying to... just thinking... just thinking how I could I receive that so instead of having a brand new approach to ask (and attempt to answer) questions about how the design process is going through... just design development... during that time... I was just thinking of how I was just trying to... just trying to put my train of thought... so just to help me comprehend what exactly I wish to do... so just trying to... just thinking... just thinking how I could I receive that so instead of having a brand new approach to ask (and attempt to answer) questions about how the design process is going through... just design development... during that time... I was just thinking of how I was just trying to... just trying to put my train of thought... so just to help me comprehend what exactly I wish to do... so just trying to... just thinking... just thinking how I could...
There are two styles of approach to ask (and attempt to answer) questions about this design project:...

Saying that, I think Gabriel (GL) has been most effective in this area...produces and uses this word-based approach in conjunction with small paper-based freehand perspective sketches...

There are one or two fragments of explanatory text in conjunction with small paper-based freehand perspective sketches...that the respondent indicates that he has plenty of experience of mind mapping...
Sub-Category:
[6] Produces and uses paperbased freehand perspective
sketches to ask (and attempt
to answer) questions about
his/her design proposals
Dimensions:
When –
just after the start of the
project
How much/often –
several sketches, all little
hand-drawn, hand-coloured
‘thumbnail’ sketches of design
ideas
Connectedness –
produces and uses these
perspective sketches in
conjunction with a word-based
approach
Understanding, Confidence
and independence –
I think high – the respondent’s
prior experience indicate that.
But the range of the design
possibilities being explored is
narrow. That said, note:
“…These last two brainstorms
were leading onto something
for me to design about…”
Size of design move –
Understanding –
see Confidence and
independence above, and
also: “…These last two
brainstorms were leading onto
something for me to design
about…”

although the thinking is not very
innovative. See also: 07 “’Cos
what I wanted to do with my first
idea [07 shows the page in his
A4 sketchbook that contains an
early freehand perspective
sketch, already tabled, showing
a human figure standing in a
rotatable drum-like structure,
complete with shading] was this
circular thing going…where
people could just walk in and
grab books…” Note also,
however, from much later in the
interview: GL “Were you
designing by then in two
dimensions because you could
see it in your head as a threedimensional thing – how did it
work for you?...[07 then tables
these, and other, drawings] Yes,
that’s actually what I mean.”
Size of design move –
the phrases “Rotate”, “Seating
area”, “Pillars/Beams”,
“Materials??
Concrete/Steel/Wood…” and
“Peter Eisenman” suggest wideranging but incremental thinking
Understanding – demonstrates
using this ideation tool with
understanding (see Confidence
and independence above)
The move 01 points to the
thumbnail sketches mentioned
above then turns 2 pages
prompts a question: what made
07 choose to point to these
sketches and then turn the
page?

from Frank Gehry” and “the
fish”, “hanoi bus stop”, “ice
hockey rink” and more –
suggest fairly connected (ie:
wide-ranging) thinking
Understanding, Confidence
and independence –
the phrases “that I like doing”
and “It’s something I do for
myself, basically I had to ...
translate all my mind mapping
into like Word documents
afterwards…” suggest
considerable confidence and
independence, perhaps, as
does, as do the contents –
nuanced statements such as
“molded plastic”,
“driftwoodlong”, “Julian
Lienhard – woven”, “layering”
and “moving structure” –
which suggest fairly fluent,
wide-ranging thinking
Size of design move –
Cannot tell
Understanding –
demonstrates using this
ideation tool with
understanding (see
Confidence and independence
above)

Sub-Category:
[33] Produces and uses
paper-based freehand sketch
diagrams to ask (and attempt
to answer) questions about
space planning concerning
his/her design proposals
Dimensions:
When –
just after the start of the
project
How much/often –
2 diagrams, one showing a
repeated geometric cellular
arrangement, one a more
organic shape/form
Connectedness –
produces and uses these
diagrams directly in
conjunction with paper-based
freehand perspective sketches
and a word-based approach
Understanding, Confidence
and independence –
maybe limited: the content of
the diagrams seems quite
mysterious (personal) and to
me less meaningful than the
perspectives-to-come –
indeed, they may be “doodles”
– but the respondent may not
agree
Size of design move –
cannot tell
Understanding –
cannot tell

Sub-Category:
[20] Produces and uses paperbased freehand perspective
sketches may be used to explain
the characteristics of a spatial
design speculation matter to
him/herself or others
Dimensions:
When –
close to the very start the project
How much/often –
1 paper-based freehand
perspective sketch, drawn with a
pen, and hand-rendered, of a set
of wheels – some sort of
Victorian machine, perhaps?
Connectedness –
used in conjunction with 1-anda-half pages of hand-writing –
she writes neatly and stylishly,
and the text seems to concern
wider secondary research:
“Portsea” and “Dockyard”; plus a
number of paper coasters used,
I think, as reminders of work to
be done - the one I can see
reads, inter alia, “dockyard” and
“history of area”; also, appears
to have produced this sketch (or
a similar one) during a visit to
the site
Understanding, Confidence and
independence –
in my judgment, this is quite a
competent sketch, including
quite lively shading and an
interesting composition that
suggests some graphic ability –
and some confidence – to me;
this is the third instance of this
approach being used, another
indication of, perhaps,
confidence and understanding;
11 states that this drawing is:
“Just to show how the proximity
between the museum and the
dockyard…just to show the
relationship that it has…they
have to each other” and “…well

I note that and that 13 points to
the previous page, and that 13
points to the boxes that highlight
items of text, and that 13 points
to the mind map. I wonder why
she is choosing to direct GL’s
attention to these items here?

100

Sub-Category:
[33] Produces and uses paperbased annotated freehand
sketch diagrams to ask (and
attempt to answer) questions
about space planning
concerning his/her design
proposals
Dimensions:
When –
right at the start of the project as
it is documented in 09’s
sketchbook
How much/often –
the 2nd right-hand sheets of 6
sheets torn out of a small (A5)
lined notebook, which shows
another series of paper-based
freehand sketch diagrams, 3
plan-like, 2
elevational/perspective-like (both
with stick-people on them)
Connectedness –
produces and uses these
diagrams in conjunction with
hand-written text: “technological
innovation”, “digitised tables”,
“white boards”, “reading”,
“private time”, “relaxation”,
“common class small”, “stage”,
“reflection space” and “tas
mccarthy”. Also used in
conjunction with at least 4 other
layers of text and paper-based
freehand sketches (see Size of
design move below)
Understanding, Confidence and
independence –
09 does not reveal or discuss all
the diagrams and text. The
diagrams on this sheet seem to
be larger in size than those on
the top layer of sheets, and to
concern one way of organizing
the circular space explored on
the top layer. They also
introduce the human form,
furniture (curved tables, one with
chairs against it) and vertical

Category:
[7] Appears to be using
dismissive words and phrases to
describe his/her paper-based
freehand design development
sketches design ideation tools
Dimension:
Frequency –
first time I have allocated this
category to this respondent
Focus –
when 04 uses “just” in “I think it
was just…we knew that we were
going to make something or
design something which was
going to be based on
something…which was going to
have a spiritual element to it.
So…this is just me…making a
collage…These are more like
very rough…just pictures of how
I want to show the space. Like,
how do I…perceive a 3D
space?...No, it’s just…a drawing
as an aid to make this.” used in
a way that I have termed
dismissively? It is hard to say. If I
were describing such sketches
to my won tutor (as 04 was) I
might be inclined to under-sell
them using phrases such as “It’s
just…a drawing as an aid to
make this,” and “…this is just
me…making a collage…” Thus, I
choose to allocate this category

Category:
[29] Is being guided by previous
educational experiences internal
educational experiences
Dimensions:
Frequency of influence –
first instance of this category
being applied to this respondent
Apparent depth of
influence –
cannot comment
Focus of influence –
05 “…some notes on it so it’s
handy to have this as a
reference.” GL “Okay…and you
were taken through it by your
tutor?” 05 “Yes.”


further on there is a, well I have used it again…”. Also note: “…that’s the way I like to work, I like to draw out everything that I see and then kind of get the feel… but I like to draw concepts and stuff…”

circulation (a short staircase) – so, more detail. The impression I get is, again, that 09 is using this method with confidence and understanding.

Size of design move – incremental, preliminary thinking about concept, function and layout. The diagrams on this sheet seem to be larger in size than those on the top layer of sheets, and to concern one way of organizing the circular space explored on the top layer. They also introduce the human form, furniture (curved tables, one with chairs against them), and vertical circulation (a short staircase) – so, more detail. Also, see the following: 09 “…then I tried to make it so maybe these different areas could be… a different level. For example, this one could be raised and could be a stage, one can be kind of like the trampoline (right side) – sounds like ‘very’) below and that can be like the communal class space and then one could kind of be like at the back, like the ‘craft’ and end, huh? The lily pad came first because it was thinking about… children coming to nursery, like 3-4 years old, they’ll be like they’re very energetic, they’re small, they’re…” thinking about bringing the outside play environment inside the classroom, so I was just thinking about different environments… from grass (trampoline 09 04 01) – could be medium size, like a small field where the… whole lily pad thing came to, so I was just thinking of a frog just jumping (trampoline 09 04 01) – I think ‘from lily pad’ by pedal and then continuing in a trajectory, and then thinking about how as a, maybe by children going from school and then… achieving and then moving on – is the next stage?”

Finally, 09 has covered quite a lot of paper: six A5 sheets. Why has she layered them in this way? If I did that, it would probably be because I produced them all at roughly the same time. While some students
might begin (even 'kick-start') a project with a mind map. It seems to have begun it with this diagram-and-text-based examination of the possibilities.
Appendix H – Diagrams showing categories, sub-categories, properties and dimensions

Figures 2 to 4 show early diagrams produced by me during this study. Figure 2 was the earliest, and shows an attempt to represent, and thus to understand, the coding process. Figure 3 shows a preliminary illustration of the axial codes produced. Figure 4 shows my initial attempts to represent diagrammatically the ideational processes of respondents 07 and 01. The diagrams in figures 3 and 4 were found not to be helpful – the former because it contained too much written material to form an effective visual summary of the codes, and the latter because they were too complex and lengthy to aid understanding – and were thus taken no further.
Figure 2 – Researcher’s preliminary diagrammatic representation of coding process
Figure 3 – Researcher’s preliminary diagrammatic representation of axial codes
Figure 4 – Researcher’s preliminary diagrammatic representation of ideational processes of respondents 07 and 01
Categories –

Category:

[18] Distinguishes between explaining and investigating design matters

Properties:

Distinguishes between using ideation tools to be used to explain the characteristics of a spatial design speculation matter to him/herself or others and also to investigate these characteristics

Dimensions:

Moves from one mode to another—haltingly/occasionally—moves from one mode to another fluently

Dimensions:

Understanding — appears confused about this — indicates clear understanding of this
Category:
[S1] Mentions (or comments on) the amount of work s/he carried out during his/her studies

Properties:
Mentions (or comments on) the amount of work s/he carried out during his/her studies

Dimensions:
- Focus of Work – eg: paper-based, freehand sketching, physical model-making, essay-writing, design ideation...
- Extent (ie: Degree of Progress Revealed) – a little...a lot
- Intensity of Work Revealed – not hard...quite hard...very hard
- Frequency – Mentions/comments on this seldom...frequently
- Evaluation – indicates that this amount of work is insufficient...barely sufficient...sufficient...excessive...
Category: [48] Evidences using the same ideation tools to achieve explanatory and investigative outcomes more or less concurrently

Properties: Evidences using the same ideation tools to achieve explanatory and investigative outcomes more or less concurrently

Dimensions:
- Confidence and independence – manifesting less or more
- Size of design move – making smaller (more incremental) or larger (more radical) changes to one’s work
- Understanding – demonstrates moving between explanatory and investigative outcomes with no understanding – limited understanding – clear understanding
- How much/often evidences this seldom…quite frequently…frequently
- When – evidences this early on in the project…later on in the project…towards the end of the project
- Connectedness – produces and uses these sketches solo or in conjunction with other ideation tools
Category:
[38] Demonstrates having an overview of his/her design process

Properties:
Demonstrates having an overview of his/her design process

Dimensions:
Demonstrates a less or more detailed overview

Dimensions:
Demonstrates an overview without being prompted/having been prompted
Category
[1] Demonstrates understanding of the functions of different types of ideation tool

Properties:
The respondent reveals that s/he is choosing and using ideation tools with understanding

Dimensions:
Demonstrates choosing ideation tools with no understanding...
"demonstrates limited understanding...
demonstrates clear understanding"

Thus:
Dimension (applied to a specific sub-category): [8] indicates a disconnected/incomplete understanding of the design process purpose of experimental models during design ideation
Properties:
Is being guided by external influences on his/her approach to design ideation, including prior education, the work/advice of peers, the advice of tutors, visits to other institutions, and/or carrying out relevant research.

Dimensions:
- Frequency of influence (never…seldom…often)
- Apparent depth of influence (superficial…profound) – linked to understanding of influence
- Focus of influence (investigation…presentation)

Category:
- [5] Is being guided by previous educational experiences and external influences and [10] his/her tutors (this has been subsumed)
Category:
[29] Is being guided by previous educational experiences internal educational experiences

Properties:
Is being guided by previous educational experiences internal educational experiences

Dimensions:
Frequency of influence – seldom...quite often...often

Dimensions:
Apparent depth of influence – superficial...profound – linked to understanding of influence superficial...profound

Dimensions:
Degree of independence (under instruction...independent choice)
This may not work so well, as the student is being guided

Dimensions:
Form of influence – investigation...presentation
The respondent mentions making exciting design discoveries experiencing a design surprise insight through ideation activities and design speculations.

**Category:**
1. Making exciting design discoveries experiencing a design surprise insight through ideation activities and design speculations.

**Dimensions:**
- **Frequency (experience a design surprise insight never - seldom - often)?**
- **Intensity/satisfaction (experience a mild - intense design surprise insight)?**
Appendix I – Examples of preliminary ‘timeline’ diagrams

These are included to provide an indication of the diagram developmental process in chronological order.
From Patrick's Suggested Diagram

Dated 01.12.15:

I'm almost back at my graphs on my laptop.

What I like to set is a line and then along the Gateway there was Research.

That would mean rethinking what my Gold caged peers extended along an algebraic method.

Not sure about those as then having a given axis and five movement, which is not correct if I did this however.

50

32

16 → 19

9

28
Appendix J – Examples of preliminary ‘synoptic’ diagrams

These examples are included to provide an indication of the diagram developmental process in chronological order.
Appendix K – Categories and sub-categories – possible repeated patterns – additional analysis

This is included to provide an example of the researcher’s analytical process.

Respondent 01’s diagram shows the sub-category [4]: Uses a word-based approach in response to a spatial design matter occurring at the start of the interview, again on a separate page slightly later and then again on a separate page slightly later (this time connected to [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter). After a period of absence, [4]: Uses a word-based approach in response to a spatial design matter re-occurs three times more, the first time unconnected, the second time connected to the category IT-D [49]: Uses real materials in response to a spatial design matter and the third time connected to IT-D [49]: Uses real materials in response to a spatial design matter and IT-C [22]: Produces and uses photographs in response to a spatial design matter and to the sub-category [33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter.

This analysis indicates that, although within respondent 01’s diagram [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter occurs most frequently, it does so in four big allocations, whilst the sub-category [4]: Uses a word-based approach in response to a spatial design matter appears to have ‘punctuated’ the interview in a more interspersed way.

It should also be noted here that respondent 01’s diagram begins with an unconnected allocation of [4]: Uses a word-based approach in response to a spatial design matter and ends with a group of connected categories and sub-categories: [4]: Uses a word-based approach in response to a spatial design matter, [33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter, [12]: Produces and uses
collage to investigate design ideas and IT-D [49]: Uses real materials in response to a spatial design matter followed by a sequence of discursive moves.

In respondent 07’s diagram, the sub-category [33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter occurs thirteen times, more than any other category or sub-category within this diagram ([6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter occurs eleven times) and is interspersed throughout it, sometimes in large allocations and sometimes not, mostly connected to [4]: Uses a word-based approach in response to a spatial design matter, [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter, [42]: Produces and uses paper-based elevation drawings, hand-drawn using a straight edge, in response to a spatial design matter, or [39]: Produces and uses paper-based freehand elevation sketches in response to a spatial design matter) but sometimes unconnected.

Respondent 07’s diagram begins with the sub-category [33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter connected to [4]: Uses a word-based approach in response to a spatial design matter and [45]: Carries out non-visual-spatial research (eg: textual, auditory, interview based...) in connection with design ideation, and ends with an unconnected category, IT-G [56]: Produces one or more physical model/s in response to a spatial design matter followed by a series of discursive moves.

It may therefore be argued that, whilst in respondent 07’s work, a range of paper-based ideational moves within the category IT-A: Uses paper-based ideation tools response to a spatial design matter played a major role, [33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter’s role appears to have underpinned much of this approach to design ideation.

In this diagram, ideational moves concerning the category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter occur on two occasions,
once near the beginning and once near the end.

Respondent 11’s diagram appears to contain evidence of several possible patterns of ideational moves. Sub-categories within the category IT-B: Carries out research in support of design ideation occur comparatively frequently early on – initially after every page turn – and also approximately fourth fifths of the way into the diagram – again frequently after every page turn. At the beginning of the diagram those sub-categories (mostly [45]: Carries out non-visuo-spatial research (eg: textual, auditory, interview based...) in connection with design ideation, but also, on occasions, [9]: Carries out supporting visuo-spatial research in connection with design ideation) combine with [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter, [4]: Uses a word-based approach in response to a spatial design matter twice, and then again (also connected to [33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter and [42]: Produces and uses paper-based elevation drawings, hand-drawn using a straight edge, in response to a spatial design matter) a little later. Also, after approximately one fifth of the way into the diagram, the category IT-C [22]: Produces and uses photographs in response to a spatial design matter occurs quite frequently, often after every page turn, often connected to a sub-category within IT-A: Uses paper-based ideation tools response to a spatial design matter (frequently [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter) or else apparently unconnected.

Respondent 11’s diagram begins with an unconnected sub-category, [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter, and ends with an unconnected sub-category, [33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter followed by a discursive move.

Three occurrences of one ideational move within the category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter occur all together in the first quarter of the diagram.
This analysis suggests that, unlike respondents 01 and 07, respondent 11’s diagram reveals an array of subtly shifting combinations, as a comparatively small number of categories and sub-categories combine, separate and form different combinations in quite a fluid manner.

Respondent 03’s diagram appears to contain evidence near the beginning of a pattern comprising the category IT-C [22]: Produces and uses photographs in response to a spatial design matter connected to the sub-category [9]: Carries out supporting visuo-spatial research in connection with design ideation and one or more sub-categories within IT-A: Uses paper-based ideation tools response to a spatial design matter. Towards the middle of the diagram, sub-categories within IT-A: Uses paper-based ideation tools response to a spatial design matter appear to play a key role (particularly [31]: Produces and uses paper-based freehand plan sketches in response to a spatial design matter, sometimes connected to other sub-categories within IT-A: Uses paper-based ideation tools response to a spatial design matter, sometimes unconnected). In the latter part of the diagram, sub-categories within IT-B: Carries out research in support of design ideation appear to play a key role ([45]: Carries out non-visuo-spatial research (eg: textual, auditory, interview based...) in connection with design ideation once, [9]: Carries out supporting visuo-spatial research in connection with design ideation twice) connected to sub-categories within IT-A: Uses paper-based ideation tools response to a spatial design matter ([31]: Produces and uses paper-based freehand plan sketches in response to a spatial design matter, [4]: Uses a word-based approach in response to a spatial design matter or [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter). This analysis suggests that, unlike respondents 01 and 07, but somewhat like respondent 11, respondent 03’s diagram reveals an array of subtly shifting combinations, as a number of categories and sub-categories combine, separate and recombine.

In this diagram, ideational moves concerning the category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter occur once, all together in the final fifth of the diagram.
More significant, however, in the researcher’s view is that early on in the diagram respondent 03 appears to have worked in a more connected way than any other respondent across the sample, with categories and sub-categories connected firstly in a group of three, then a group of five, then a group of four, and then another group of four.

In respondent 13’s diagram, the category IT-C [22]: Produces and uses photographs in response to a spatial design matter (often connected to the sub-category [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter and the category IT-G [56]: Produces one or more physical model/s in response to a spatial design matter) occurs five times in the second and third fifths of the diagram. From the second fifth of the diagram onwards, the sub-category [33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter occurs comparatively frequently, often connected to [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter, [31]: Produces and uses paper-based freehand plan sketches in response to a spatial design matter and/or [32]: Produces and uses paper-based freehand section sketches in response to a spatial design matter.

Respondent 13’s diagram begins and ends with an unconnected sub-category – firstly [4]: Uses a word-based approach in response to a spatial design matter, and finally [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter – followed by two discursive moves.

In this diagram, ideational moves concerning the category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter occur once in the latter stage.

The sub-category [9]: Carries out supporting visuo-spatial research in connection with design ideation appears to ‘punctuate’ much of respondent 05’s diagram in that it is allocated on almost every page and is therefore repeated frequently throughout. This possible pattern is interspersed by three large allocations of the category IT-C [22]: Produces and uses
photographs in response to a spatial design matter during the early stage, and then followed later on by several sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter.

Respondent 05’s diagram begins with the sub-categories [9]: Carries out supporting visuo-spatial research in connection with design ideation and [12]: Produces and uses collage to investigate design ideas used connectedly, and ends with an unconnected sub-category, [65]: Uses CAD software to produce section drawings to in response to a spatial design matter, followed by a comparatively lengthy series of discursive moves.
Appendix L - Diagrammatic enumeration of connections between categories and sub-categories

This is included to provide a glimpse of the researcher’s analytical process – it is understood that such a large diagram cannot be seen clearly in this thesis.
Appendix M – Examples of researcher’s reflective practice

These are included to provide examples of the researcher’s analytical process.

1st January 2017

Now that the Literature review is almost ‘complete’ (by which I mean complete enough to be ‘put to bed’)

So what is the purpose of this Literature review? "As a registered architect and spatial design academic the researcher possessed at the beginning of this study an understanding of how paper-based freehand sketches may be used for ideational purposes. However, it was clear that this understanding needed to be enhanced considerably in order to contextualise the study by:

a.) identifying whether the research questions listed in the Introduction had already been answered and (if they had not)

b.) ascertaining if any research into the use of paper-based freehand sketches for ideation purposes could inform the work being carried out here

The Literature review was conducted to provide this context and to ascertain the importance of research into this field."

"It was stated at the start of the Literature review that researcher sought to contextualise this study by:

a.) identifying whether the research questions listed in the Introduction had already been answered and (if they had not)

b.) ascertaining if any research into the use of paper-based freehand sketches for ideation purposes could inform the work being carried out here

The Literature review was conducted to provide this context. Thus, it should be noted that the researcher investigated research into the more prosaic operational benefits of using paper-
based freehand sketches for ideational purposes, into a range of cognitive aspects, into expertise and mental imaging in design ideation and into the apparent decline of paper-based freehand sketching within spatial design higher education, not in order to analyse the data exclusively in these terms but in order to gain a broader context to the study and to demonstrate the importance of research into this field."

14th December 2016

Reflections just before I write the final section of my Thesis conclusions!

A scary moment! What if when I start putting down my thoughts I find I’ve nothing worthwhile to say, or am confused about what I am trying to say, or discover substantial holes in my argument, or realise I must write 1000s of words to get the main points across? Well, the short answer to any of these is: I must deal with them. But my ‘gut’ tells me I do have something worthwhile to say and am not confused about it, and that, if I discover substantial holes these must be discussed as limits and shortcomings rather than filled at this stage. Furthermore, if I find I need to write a lot I must do that and then edit in the weeks ahead. As I see it this is the part of my thesis when it either all comes together or is revealed to be worthless but I suspect that is not correct: there is a mid-point which is: this is what I have found, these are what the limitations are and this is what I will do about them post-doctorate.

To begin with, let us review the research questions:

- Which ideation moves were used by spatial design undergraduates and why did they use them?

- How frequently did each spatial design undergraduate use each of these ideation moves and what appeared to be the reasons behind this?

- What patterns of ideation move use were manifest and what appeared to be the reasons for these?
What degrees of connectedness between ideation moves were manifest in each interview and what appeared to be the reasons for these?

How did each respondent approach the discussion of their ideation work and what were the apparent reasons for the approach/es revealed?

How did the above compare across the sample and for what apparent reasons?

Which ideation moves were used by spatial design undergraduates and why did they use them?

At a category-level it would appear that all the respondents evidenced a basic toolkit of categories: IT-A: Uses paper-based ideation tools response to a spatial design matter, IT-B: Carries out research in support of design ideation, and IT-C [22]: Produces and uses photographs in response to a spatial design matter. In addition, respondents 07, 11, 03, 13 and 05 all appear to have evidenced the category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter and respondents 07, 11 and 13 the category IT-G [56]: Produces one or more physical model/s in response to a spatial design matter. If this is indeed the case the researcher suspects that few spatial design practitioners and academics would find it particularly surprising: it is surely to be expected that most if not all spatial design undergraduates would produce paper-based ideation tools, carry out research and produce and use photographs, and produce two- or three-dimensional digital images and one or more physical model/s during design project work. However, the researcher is more interested in respondent 01 from level 4 and 05 from level 6 who appear not to have followed this pattern. Neither evidenced the category IT-G [56]: Produces one or more physical model/s in response to a spatial design matter; respondent 01 did not evidence IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter; both evidenced IT-D [49]: Uses real materials in response to a spatial design matter (whilst no other diagram does); and respondent 05, uniquely within the sample, evidenced IT-F [64]: Generates ideas in response to a spatial design matter by chance through an experiential, sensorial approach.
In comparison with the category-level results the range of sub-categories, and categories that
do not contain sub-categories, evidenced by the respondents varied considerably.
Respondent 07 evidenced a total of eighteen groups of distinct ideational moves, the widest
range across the sample, and respondent 01 a total of seven, the narrowest range, yet both
were level 4 students albeit at different institutions. Respondent 11 evidenced a total of
sixteen groups of distinct ideational move, the second widest range across the sample, and
respondent 03 a total of ten, the second narrowest, yet both were level 5 students albeit at
different institutions. Respondent 13 evidenced a total of thirteen groups of distinct ideational
move, and respondent 05 twelve, a narrower range than those of respondents 07 or 11, but a
wider range than those of respondents 01 and 03, yet respondents 13 and 05 were both level
6 students albeit at different institutions. Before producing the ‘synoptic’ diagrams the
researcher had speculated on whether these would evidence clear patterns of ideational
move occurrence and on whether there might be clear differences or similarities between
institutions. However, the diagrams suggest that across the sample ideational move
occurrence at the level of sub-categories, and categories that do not contain sub-categories,
was heterogeneous and unpredictable, and that this cannot be explained satisfactorily by
referring to the student’s academic level or institution.

Finer-grained analysis of the sub-categories within their respective categories suggests that
there may be a basic toolkit of these across the sample. Within the category IT-A: Uses
paper-based ideation moves response to a spatial design matter all the respondents
evidenced the sub-categories [4]: Uses a word-based approach in response to a spatial
design matter, [6]: Produces and uses paper-based freehand perspective sketches in
response to a spatial design matter and [33]: Produces and uses paper-based freehand
sketch diagrams in response to a spatial design matter; respondents 07, 11, 03, 13 and 05
evidenced [31]: Produces and uses paper-based freehand plan sketches in response to a
spatial design matter and [39]: Produces and uses paper-based freehand elevation sketches
in response to a spatial design matter; respondents 01, 11, 13 and 05 evidenced [12]:
Produces and uses collage to investigate design ideas; and respondents 11, 03, 13 and 05
evidenced [32]: Produces and uses paper-based freehand section sketches in response to a
spatial design matter. That said, this category indicates considerable heterogeneity. Only
respondents 07 and 11 evidenced [40]: Produces and uses paper-based plan drawings, hand-drawn using a straight edge, in response to a spatial design matter; only respondent 07 evidenced [73]: Produces and uses paper-based section drawings, hand-drawn using a straight edge, in response to a spatial design matter; and only respondent 11 evidenced [58]: Creates and uses painting/s experimentally in response to a spatial design matter. Overall, respondent 01 (from level 4) evidenced the narrowest range of sub-categories within this category, respondents 07 and 11 (from levels 4 and 5 respectively) the joint widest.

Within the category IT-B: Carries out research in support of design ideation all the respondents evidenced the sub-category [9]: Carries out supporting visuo-spatial research in connection with design ideation. It is possible that this may comprise the basic toolkit within this category. However, only respondents 07 (from the high-ranking institution, level 4), 11 (from the former polytechnic, level 5) and 03 (from the researcher’s institution, level 5) evidenced [45]: Carries out non-visuo-spatial research (eg: textual, auditory, interview based...) in connection with design ideation suggesting that this does not form part of the basic toolkit.

Within the category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter the respondents evidenced a range of sub-categories across the sample: respondents 07, 11 and 03 evidenced [30]: Uses CAD software to produce 3D drawings in response to a spatial design matter; respondents 07, 11 and 13 evidenced [60]: Uses CAD software to produce plan in response to a spatial design matter; respondents 07, 13 and 05 evidenced [65]: Uses CAD software to produce section drawings to in response to a spatial design matter; respondent 13 alone evidenced [63]: Uses CAD software to produce elevation drawings in response to a spatial design matter; and respondent 07 alone evidenced [66]: Uses CAD software to produce exploded isometric drawings in response to a spatial design matter. Overall, respondent 01 (from the researcher’s institution, level 4) evidenced no sub-categories within this category, respondent 07 (from the high-ranking institution, level 4) the widest range, respondent 13 (from the former polytechnic, level 6) the second-widest, respondent 11 (from the former polytechnic, level 5) the third-widest, and respondents 03 and 05 (from the researcher’s institution, levels 5 and 6 respectively) the
second-narrowest. No respondent evidenced all the sub-categories within this category suggesting that they do not form part of the basic toolkit. Before producing the 'synoptic' diagrams the researcher had speculated on whether these would evidence abundant use of CAD software at most or all of the institutions. However, the diagrams have indicated that across the sample CAD usage was somewhat lower than the use of paper-based ideation moves response to a spatial design matter (IT-A: Uses paper-based ideation moves response to a spatial design matter) and that this cannot be explained satisfactorily by referring to the student’s academic level (although respondents from the researcher’s own institution appear to have evidenced lowest usage).

This analysis indicates that the more closely the data is examined the more it becomes apparent that the respondents’ approaches to ideation evidence considerable heterogeneity. The are indications of a basic toolkit of sub-categories shared by all respondents but the overall range appears to have varied considerably and which respondent evidenced the widest range of sub-categories, or categories that do not contain sub-categories, which the narrowest, and so on seems not to have depended upon academic level or institution.

How frequently did each spatial design undergraduate use each of these ideational moves and what appeared to be the reasons behind this? How did the above compare across the sample and for what apparent reasons?

The category with the highest number of allocations across the sample was IT-A: Uses paper-based ideation tools response to a spatial design matter (respondent 07: one-hundred-and-twenty-nine allocations) and this was always the category with the highest number of allocations for each respondent (respondent 13: one-hundred allocations; respondent 11: ninety-one allocations; respondents 05 and respondent 01: forty-seven allocations; and respondent 03: thirty-three allocations) within that category the range of allocations of the various sub-categories was somewhat diverse. The most-allocated sub-category overall was [6]: Produces and uses paper-based freehand perspective sketches in response to a spatial design matter except for respondent 07 in whose case it was [33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter. Moreover, the sub-category [6]: Produces and uses paper-based freehand perspective sketches in response to a
spatial design matter was allocated to respondent 11 forty times, respondent 07 thirty-five times, respondent 01 thirty-four times, respondent 13 twenty-eight times, respondent 05 seventeen times and respondent 03 six times whilst the sub-category [33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter was allocated to respondent 07 sixty times, respondent 11 twenty-nine times, respondent 13 eighteen times, respondent 05 eleven times, respondent 01 six times and respondent 03 three times. Furthermore, the category IT-C [22]: Produces and uses photographs in response to a spatial design matter was allocated to respondent 11 seventy-seven times: the highest allocation of any sub-category, and category that does not contain sub-categories, for this respondent, however it was allocated to the other respondents somewhat less frequently: to respondent 05 twenty-six times; to respondent 03 twenty-two times; to respondent 13 sixteen times; to respondent 07 twelve times; and to respondent 01 eight times. Finally, the sub-category [9]: Carries out supporting visuo-spatial research in connection with design ideation was allocated to respondent 05 twenty-four times and the category IT-C [22]: Produces and uses photographs in response to a spatial design matter twenty-six allocations which in combination were more than the total allocation of sub-categories within IT-A: Uses paper-based ideation tools response to a spatial design matter. These results suggest a rather complicated situation in which there is no certain correlation between the range of sub-categories, and categories that do not contain sub-categories, allocated to each respondent and the total number of moves identified within each. Thus, as was stated above respondent 07 evidenced the widest range of sub-categories, and categories that do not contain sub-categories, across the sample but respondent 11 evidenced the highest quantity of moves within those (two-hundred-and-five overall); respondent 11 evidenced the second-widest range of sub-categories, and categories that do not contain sub-categories, across the sample but respondent 07 evidenced the second-highest quantity of moves within those (one-hundred-and-sixty-one); respondent 13 evidenced the third-highest range of ideational moves across the sample and the third-highest quantity of allocations within those ideational moves within those (one-hundred-and-twenty-nine); respondent 05 evidenced the fourth-highest range of sub-categories, and categories that do not contain sub-categories, across the sample and the fourth-highest quantity of moves within those (one-hundred-and-three);
respondent 03 evidenced the second-narrowest range of sub-categories, and categories that do not contain sub-categories, across the sample and the second-lowest quantity of moves within those (sixty-seven); and respondent 01 evidenced the narrowest range of sub-categories, and categories that do not contain sub-categories, across the sample and the lowest quantity of moves within those (fifty-nine).

It was noted above that the respondents’ approach to design ideation appeared to be more heterogeneous and unpredictable the more fine-grained the analysis was of the diagrams. The analysis of allocations of sub-categories, and categories that do not contain sub-categories, across the sample suggests that each respondent within the sample was making different choices from the ideational moves available – in some cases markedly so.

I now have a solid chunk of text dealing with the answers to the research questions, and a solid chunk of text dealing with what other explanations of the data concerning discursive moves might be feasible and touching on how these are all translations. What now?

Reflection

1. I need to deal with other explanations of the data on ideational moves: it may be argued that I saw and heard what I saw and heard, but the sketchbook material was not always clear (in that it could be difficult-to-see because it was out of focus, out of shot or shown only briefly, and/or also difficult-to-understand because it was ambiguous, and thus needed interpretation), the spoken words were not always clear (in that they could be difficult-to-hear because of background noise or low sound volume, and/or also difficult-to-understand because they were ambiguous, and thus needed interpretation) and the respondent’s behaviour during each interview was not always clear (because the researcher found it unexpected and/or puzzling, and it thus needed interpretation). Also, the sketchbook material discussed was rarely complete. The respondents made selections by showing work they had brought but not discussing it, not showing work that they had brought (although on occasions the researcher could catch glimpses of it), mentioning work they had not brought, and pointing to and discussing certain items and not others. Hand-written or word-processed text was never read out loud in full word-for-word and pages of sketches and photographs were
never discussed in full item-by-item - the respondents seemed not to want or expect to do this and the researcher was aware that there was insufficient time. Thus, I was translating the sketchbook material and the respondents were translating it.

2. I need to summarise the 'main' outcomes:

Ideational moves -

2.1 plenty of paper-based freehand sketching

2.2 no over-reliance on word-based approaches

2.3 no over-reliance on CAD

2.4 connectedness seemed during traditional grounded theory analysis to be significant in that the ideational moves seemed to be used in comparatively distinct ways and pattern-free across the sample but the levels of connectedness appeared to be a way of spotting previously hidden patterns. However, a more careful - fine-grained - analysis of the categories, sub-categories and dimensions led to an understanding that connectedness was not the key to unlocking sketchbook material but that there was a basic toolkit of ideational moves common across most or all of the sample with also plenty of evidence of heterogeneity - according to the study sketchbook material and approaches to ideation seem to be extremely diverse. This heterogeneity spanned the categories, sub-categories connectedness and patterns of allocation.

2.5 this basic toolkit seemed not to result in design ideas that were fresh, surprising, amazing, but in more - or less (depending on how thoroughly it was used) - thoroughness. The results seemed generally to be safe and predictable. The moves outside of the basic toolkit - all of which seemed to be used comparatively fleetingly - seemed to be the ones that provoked unexpected results.

2.6 one of the respondents mentioned sketchbooks as being places where there was 'room for chaos' but the researcher found little evidence of chaos in the sketchbook material viewed across the sample. The basic toolkit and the heterogeneous approaches did not result in
fresh, amazing design outcomes. Only in respondent 05’s sketchbook material was there the sense of a student who really did not know what they were doing, whose approach was disorganised, confusing and frustrating and who was surprised by the design outcomes. This is a difficult position to take because the researcher did not set out to judge the quality of design output but it needs to be said.

Discursive moves -

2.7 Viewed synoptically it can be argued that the respondents were approaching the interview in a variety different ways: as fairly open and honest rapporteurs (respondents 01 and 07), as people who were to a greater or lesser extent cautious about what they revealed respondent 11, 03 and 13), and even as a somewhat mysterious and perhaps even deceptive interviewee (respondent 05). Moreover, it is important to note that the sketchbook material cannot easily be understood without the student present - it becomes a black box - yet the student may not be a reliable interpreter of the work. Thus, it is notable that in 1. above I cannot discuss the ideational moves without discussing discursive moves because the student was a filter that allowed a view of that work to be formed, but the researcher was also a filter. Thus, for assessment purposes it is important that the student is present when sketchbook material is being discussed, but also important to note that the respondent gives an edited account: the sketchbook is not necessarily an authentic account of the student’s design ideation but part of a performance.

3. I should consider writing an entire section on translation, setting out the full range of translations: respondents changing their behaviour (because some thought they were in an interview, others in a tutorial - as revealed by the discursive moves), me changing my behaviour (inter alia, although I went to the interview wanting data, my concerns about camcorder power and interview length (plus the time taken to transcribe) left me feeling in a rush and keen to end the interview even though I had less data than I had wanted or could have had), the sketchbook material changing its behaviour (by being shown in a different way than it had been produced or shown to a tutor), the physical context causing me to change my behaviour (because of the busy-ness or noise), the analytical process (because my meeting certain data, and certain obstacles, led to the project changing its focus) and more.
4. I need to make the point that the interview material went through analysis on several occasions. As the actual interview was progressing the researcher was carrying out preliminary analysis of each item of sketchbook material revealed and each statement by the respondent to determine what to say next. Whilst this was going on it is likely that each respondent was also analysing the interview, deciding how to answer the researcher’s questions, what to show and say next, and where they wanted the interview to do. Later analysis took place once the video-recording could be viewed.

5. I need to go back to the ‘Socio-material theory’ chapter and add some of the more prosaic stuff to that - my missing data through poor videoing, or misinterpreting data, for example.

6. What is ‘wrong’ with the project:

   the small sample means that patterns cannot be posited with confidence

   missing data means that patterns may not have been spotted

   time constraints led to data from some respondents not being analysed

2nd July 2016

After my tutorial with Professor Patrick Carmichael on Thursday 30.06.16

1. What chapter comes before the Methodology? Usually this would be the Conceptual Framework, explaining how I am conceptualizing my research. This will contain what I have taken from the literature – particular sources, key concepts, perhaps. But this is not quite right for my thesis. What I need to do is to produce a Descriptive Methodology chapter, which is a fairly descriptive account of what I did, then a Conceptual chapter that conceptualizes what I did and where I went next – Law, Callon, Latour, Charmaz. Conceptualization (or, better, re-conceptualising, because I changed my approach en route) came after the data, so a bridging
chapter is needed. The unit of analysis changed, the focus of analysis changed (but certain things – heterogeneity, connectedness – remained).

2. Translations: the creation of the design work by the student and the retelling in the interview – these are two translations. In my analysis chapter there will be another translation.

3. My thesis will have an unusual structure because of the particular analytic path I have taken. In the beginning I’ll need to locate the study and review the literature. I should mention in earlier chapters that Latour is coming later. The data is so rich it has enabled me to find much more in it. This represents one sequence of translations that I chose to take. Had I chosen a different focus I might have ended up somewhere different. What did I decide was salient, and why?

4. My earlier analysis led to many codes – more and more – but no conclusions; a huge mass of “quite variably structured data” and too many words: “a classic problem in grounded theory.” This work did not appear to generate the insights that I needed. I still refer to bits of it: connectedness, heterogeneity. But I now refer also to ANT: a consideration of translations has taken me somewhere more interesting. I’m still discussing about connectedness but it’s no longer just structural, it includes page-turning, pointing etc. The Charmaz:Latour sensitivity has helped me to see more. This is not triangulation, it’s mixed methods but at an epistemological level (not mixed data collection), where I’m still finding that connectedness is important but I’m thinking about it in a slightly different way.

5. There is a ‘Deleuzian fold’ here: it starts at version 1 of my methodology, which was abandoned; version 2 takes us further. But this is not a backtrack at the end of version 1, followed by something new. It’s a sweep back to version 1 to have another look at it, discovering connectedness this time, then moving on and then returning for another look using ANT. Picture a vertical, extended ‘S’ curve. My first sweep: conventional but robust grounded theory. My second sweep: ANT, a move to being a much more reflexive qualitative researcher. Grounded theory has been a way of generating and tracing the translations.

6. I’m an insider researcher because I’m within the discipline and having conversations with the researchers I am very much part of the research process. I am also inside the data, as a
voice, as a hand turning a page etc, so I’m another kind of insider researcher. I could have stepped back from this in a Strauss and Corbin way but through ANT I’ve kept myself present in the research, so here is the third version an insider researcher: the translations are no longer teacher to student or student to sketchbook, I am an actor in that network.

7. To summarise:

Chapter 1: The problem space. Here I should define myself as an insider researcher, version 1

Chapter 2: Literature review

Chapter 3: Ontology, epistemology and the researcher. On the way to the Descriptive Methodology, I need to state my assumptions that deep, almost ethnographic, qualitative multi-modal study was necessary.

Chapter 4: My broad approach – observational, interviews, videos…the Descriptive Methodology. Here I should define myself as insider researcher version 2

Chapter 5: Conceptual chapter. At the end I should define myself as ANT-related version 3 insider researcher: I am now inside the research process, and therefore, “This is the story you’re going to get, not others although they would have been available if another researcher had taken on this project.” I’m telling a story of my journey through this project.

8. Salience: read about it in expertise theory.

9. Consider “the uncanny”: the things I don’t ask about and you’re not going to tell me.

10. Patrick is not sure about the term “variables.”

Reflection:

1. What chapter comes before the Methodology? Usually this would be the Conceptual Framework, explaining how I am conceptualizing my research. This will contain what I have
taken from the literature – particular sources, key concepts, perhaps. But this is not quite right
for my thesis. What I need to do is to produce a Descriptive Methodology chapter, which is a
fairly descriptive account of what I did, then a Conceptual chapter that conceptualizes what I
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theory.” This work did not appear to generate the insights that I needed. I still refer to bits of it:
connectedness, heterogeneity. But I now refer also to ANT: a consideration of translations
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followed by something new. It’s a sweep back to version 1 to have another look at it,
discovering connectedness this time, then moving on and then returning for another look
using ANT. Picture a vertical, extended ‘S’ curve. My first sweep: conventional but robust
grounded theory. My second sweep: ANT, a move to being a much more reflexive qualitative
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stepped back from this in a Strauss and Corbin way but through ANT I’ve kept myself present
in the research, so here is the third version an insider researcher: the translations are no
longer teacher to student or student to sketchbook, I am an actor in that network.

7. To summarise:

Chapter 1: The problem space. Here I should define myself as an insider researcher, version 1

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Methodology, I need to state my assumptions that deep, almost ethnographic, qualitative
multi-modal study was necessary.

Chapter 4: My broad approach – observational, interviews, videos…the Descriptive
Methodology. Here I should define myself as insider researcher version 2

My first task is to produce a Descriptive Methodology chapter as outlined above. I should
start, I think, by drafting the structure: what comes first, second etc?

Chapter 5: Conceptual chapter. At at the end I should define myself as ANT-related version 3
insider researcher: I am now inside the research process, and therefore, “This is the story
you’re going to get, not others although they would have been available if another researcher
had taken on this project.” I’m telling a story of my journey through this project.

8. Salience: read about it in expertise theory.
9. Consider “the uncanny”: the things I don’t ask about and you’re not going to tell me.

10. Patrick is not sure about the term “variables.”

The structure to the Descriptive Methodology chapter:

1. What I set out to do:

   i. carry out interviews

   ii. transcribe them

   iii. open code and sub-code the transcriptions (particularly informed by Strauss and Corbin - open coding)

   iv. devise axial codes and sub-codes

   v. draw conclusions.

2. What went wrong:

   the project stalled between iii. and iv.

3. What did I do about that?

   i. looked at the data, and the open codes and sub-codes I’d produced

   ii. read more (particularly Strauss and Corbin - axial coding)

   ii. found out about properties and dimensions

   iv. created categories and sub-categories

   v. analyzed those

   vi. made a statement: it seems that connectedness is an important dimension across the respondents

   v. read Charmaz and Latour and began to see the value of produced diagrams
vi. produced those diagrams and analyzed them

vii. drew much more interesting and convincing and exciting conclusions!
Appendix N – Still photographs from the video-recordings

These are included to provide examples of the respondents’ sketchbook material and how they pointed and gestured to it.

Respondent 06
Respondent 12
Appendix O – Ideational moves not tabulated in thesis because of limited space

Respondent 07 evidenced a sub-category which shares (with respondent 03 – see below) the thirteenth-highest level of connectedness across the sample: [40]: Produces and uses paper-based plan drawings, hand-drawn using a straight edge, in response to a spatial design matter indicates eight connections in total, including multiple connections to one sub-category. All eight of these connections are to sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter.

Respondent 03 evidenced a sub-category which shares (with respondent 07 – see above) the thirteenth-highest level of connectedness across the sample: [4]: Uses a word-based approach in response to a spatial design matter indicates eight connections in total, including multiple connections to one sub-category. It will be noted that three of these connections are to a sub-category within the category [9]: Carries out supporting visuo-spatial research in connection with design ideation, two to the category IT-C [22]: Produces and uses photographs in response to a spatial design matter, two to sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter, and one to a sub-category within the category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter.

Respondent 07 evidenced a sub-category with the fourteenth-highest level of connectedness across the sample: [42]: Produces and uses paper-based elevation drawings, hand-drawn using a straight edge, in response to a spatial design matter indicates seven connections in total, including multiple connections to sub-categories. Five of these connections are to sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter, and two to a sub-category within the category IT-B: Carries out research in support of design ideation.
Respondent 07 evidenced a sub-category which shares (with respondents 11 and 13 – see below) the fifteenth-highest level of connectedness across the sample: [4]: Uses a word-based approach in response to a spatial design matter indicates six connections in total, including multiple connections to sub-categories. Five of these connections are to sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter, and one to a sub-category within the category IT-B: Carries out research in support of design ideation.

Respondent 11 evidenced a sub-category which shares (with respondents 07 – see above – and 13 – see below) the fifteenth-highest level of connectedness across the sample: [32]: Produces and uses paper-based freehand section sketches in response to a spatial design matter indicates six connections in total, including multiple connections to sub-categories. It will be noted that four of these connections are to a sub-category within the category IT-A: Uses paper-based ideation tools response to a spatial design matter, and two to the category IT-C [22]: Produces and uses photographs in response to a spatial design matter.

Respondent 13 shares (with respondents 07 and 11 – see above) the fifteenth-highest level of connectedness across the sample: IT-G [56]: Produces one or more physical model/s in response to a spatial design matter indicates six connections in total, including multiple connections to sub-categories. Three of these connections are to a sub-category within the category IT-A: Uses paper-based ideation tools response to a spatial design matter, and two to the category IT-C [22]: Produces and uses photographs in response to a spatial design matter.

Respondent 13 also evidenced another sub-category which shares (with respondents 07 and 11 – see above) the fifteenth-highest level of connectedness across the sample: [60]: Uses CAD software to produce plan in response to a spatial design matter indicates six connections in total. Four of these connections are to sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter, and two to sub-
categories within the category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter.

Respondent 01 evidenced a sub-category which shares (with respondent 13 – see below) with the sixteenth-highest level of connectedness across the sample: [4]: Uses a word-based approach in response to a spatial design matter indicates five connections in total, including multiple connections to one sub-category. Three of these connections are to sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter, one to the category IT-D [49]: Uses real materials in response to a spatial design matter, and one to the category IT-C [22]: Produces and uses photographs in response to a spatial design matter.

Respondent 13 evidenced a sub-category which shares (with respondent 01 – see above) with the sixteenth-highest level of connectedness across the sample: [63]: Uses CAD software to produce elevation drawings in response to a spatial design matter indicates five connections in total. Three of these connections are to sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter and two to sub-categories within the category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter.

Respondent 13 also evidenced another sub-category which shares (with respondent 01 – see above) with the sixteenth-highest level of connectedness across the sample: [65]: Uses CAD software to produce section drawings to in response to a spatial design matter indicates five connections in total. Three of these connections are to sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter and two to sub-categories within the category IT-E: Produces two- or three-dimensional digital images in response to a spatial design matter.

Respondent 07 evidenced a sub-category which shares (with respondents 11 and 03 – see below) the seventeenth-highest level of connectedness across the sample: [41]: Produces
and uses paper-based perspective drawings, hand-drawn using a straight edge, in response to a spatial design matter indicates four connections in total. All of these connections are to sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter.

Respondent 07 also evidenced another sub-category which shares (with respondents 11 and 03 – see below) the seventeenth-highest level of connectedness across the sample: [43]: Produces and uses paper-based isometric drawings, hand-drawn using a straight edge, in response to a spatial design matter indicates four connections in total. All of these connections are to sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter.

Respondent 07 also evidenced another sub-category which shares (with respondents 11 and 03 – see below) the seventeenth-highest level of connectedness across the sample: [39]: Produces and uses paper-based freehand elevation sketches in response to a spatial design matter indicates four connections in total. All of these connections are to sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter.

Respondent 11 shares (with respondents 07 – see above – and 03 – see below) the seventeenth-highest level of connectedness across the sample: IT-G [56]: Produces one or more physical model/s in response to a spatial design matter indicates four connections in total. Three of these connections are to the category IT-C [22]: Produces and uses photographs in response to a spatial design matter, and one to a sub-category within the category IT-A: Uses paper-based ideation tools response to a spatial design matter.

Respondent 03 evidenced a sub-category which shares (with respondents 07 and 03 – see above) the seventeenth-highest level of connectedness across the sample: [39]: Produces and uses paper-based freehand elevation sketches in response to a spatial design matter indicates four connections in total. Two of these connections are to sub-categories within the...
category IT-A: Uses paper-based ideation tools response to a spatial design matter, and two to the category IT-C [22]: Produces and uses photographs in response to a spatial design matter.

Respondent 03 also evidenced another sub-category which shares (with respondents 07 and 03 – see above) the seventeenth-highest level of connectedness across the sample: [32]: Produces and uses paper-based freehand section sketches in response to a spatial design matter indicates four connections in total. All of these connections are to sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter.

Respondent 01 also shares (with respondents 07, 11, 03 and 05 – see below) the eighteenth-highest level of connectedness across the sample: IT-D [49]: Uses real materials in response to a spatial design matter indicates three connections in total. Two of these connections are to a sub-category within the category IT-A: Uses paper-based ideation tools response to a spatial design matter, and one to the category IT-C [22]: Produces and uses photographs in response to a spatial design matter.

Respondent 01 also evidenced another sub-category which shares (with respondents 07, 11, 03 and 05 – see below) the eighteenth-highest level of connectedness across the sample: [33]: Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter indicates three connections in total. One of these connections is to a sub-category within the category IT-A: Uses paper-based ideation tools response to a spatial design matter, one to the category IT-D [49]: Uses real materials in response to a spatial design matter, and one to the category IT-C [22]: Produces and uses photographs in response to a spatial design matter.

Respondent 01 also has another category which shares (with respondents 07, 11, 03 and 05 – see below) the eighteenth-highest level of connectedness across the sample: IT-C [22]: Produces and uses photographs in response to a spatial design matter indicates three
connections in total. Two of these connections is to a sub-category within the category IT-A: *Uses paper-based ideation tools response to a spatial design matter*, and one to the category IT-D [49]: *Uses real materials in response to a spatial design matter*.

Respondent 07 evidenced a sub-category which shares (with respondents 01 – see above – 11, 03 and 05 – see below) the eighteenth-highest level of connectedness across the sample: [9]: *Carries out supporting visuo-spatial research in connection with design ideation* indicates three connections in total. Both of these connections are to a sub-category within the category IT-A: *Uses paper-based ideation tools response to a spatial design matter*.

Respondent 07 also evidenced another sub-category which shares (with respondents 01 – see above – 11, 03 and 05 – see below) the eighteenth-highest level of connectedness across the sample: [66]: *Uses CAD software to produce exploded isometric drawings in response to a spatial design matter* indicates three connections in total. All of these connections are to a sub-category within the category IT-E: *Produces two- or three-dimensional digital images in response to a spatial design matter*.

Respondent 11 evidenced a sub-category which shares (with respondents 01 and 07 – see above – and 03 and 05 – see below) the eighteenth-highest level of connectedness across the sample: [30]: *Uses CAD software to produce 3D drawings in response to a spatial design matter* indicates three connections in total. One of these connections is to a sub-category within the category IT-A: *Uses paper-based ideation tools response to a spatial design matter*, one to a sub-category within the category IT-B: *Carries out research in support of design ideation*, and one to the category IT-C [22]: *Produces and uses photographs in response to a spatial design matter*.

Respondent 03 evidenced a sub-category which shares (with respondents 01, 07 and 11 – see above – and 05 – see below) the eighteenth-highest level of connectedness across the sample: [33]: *Produces and uses paper-based freehand sketch diagrams in response to a spatial design matter* indicates three connections in total. All of these connections are to a
sub-category within the category IT-A: Uses paper-based ideation tools response to a spatial design matter.

Respondent 03 evidenced another sub-category which shares (with respondents 01, 07 and 11 – see above – and 05 – see below) the eighteenth-highest level of connectedness across the sample: [30]: Uses CAD software to produce 3D drawings in response to a spatial design matter indicates three connections in total. Two of these connections are to a sub-category within the category IT-A: Uses paper-based ideation tools response to a spatial design matter, and one to the category IT-C [22]: Produces and uses photographs in response to a spatial design matter.

Respondent 05 evidenced a sub-category which shares (with respondents 01, 07, 11 and 03 – see above) the eighteenth-highest level of connectedness across the sample: IT-C [22]: Produces and uses photographs in response to a spatial design matter indicates three connections in total. All of these connections are to a sub-category within the category IT-A: Uses paper-based ideation tools response to a spatial design matter.

The above all concern categories and sub-categories which themselves show low levels of connectedness (IT-G [56]: Produces one or more physical model/s in response to a spatial design matter in respondent 11’s diagram has only four connections in total; [66]: Uses CAD software to produce exploded isometric drawings in response to a spatial design matter in respondent 07’s diagram has only three connections in total; [30]: Uses CAD software to produce 3D drawings in response to a spatial design matter in respondent 07’s diagram has only two connections in total; [60]: Uses CAD software to produce plan in response to a spatial design matter in respondent 07’s diagram has only two connections in total; [45]: Carries out non-visuo-spatial research (eg: textual, auditory, interview based...) in connection with design ideation in respondent 03’s diagram has only one connection in total; and IT-D [49]: Uses real materials in response to a spatial design matter in respondent 05’s diagram has only one connection in total). Thus, it would appear that high connectedness is related
strongly to sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter.

That said, certain sub-categories that are considerably less highly-connected also show connections to sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter – for example, respondent 13’s diagram shows IT-G [56]: Produces one or more physical model/s in response to a spatial design matter (the joint-fifteenth-highest-connected sub-category/category that does not contain a sub-category) connected to other sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter; and respondent 03’s diagram shows [32]: Produces and uses paper-based freehand section sketches in response to a spatial design matter (the joint-seventeenth-highest-connected sub-category/category that does not contain a sub-category) connected to other sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter; respondent 01’s diagram shows IT-D [49]: Uses real materials in response to a spatial design matter (the joint-eighteenth-higher-connected sub-category/category that does not contain a sub-category) connected to other sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter; and respondent 07’s diagram shows [9]: Carries out supporting visuo-spatial research in connection with design ideation (the joint-seventeenth-highest-connected sub-category/category that does not contain a sub-category) connected to other sub-categories within the category IT-A: Uses paper-based ideation tools response to a spatial design matter. Thus, the category IT-A: Uses paper-based ideation tools response to a spatial design matter appears to be a strong indicator of high connectivity but may be present in instances of comparatively low connectivity.