

I am not a superhero but I do have secret weapons! Using technology in Higher Education teaching to redress the power balance

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Abstract

This article explores the role of technology in supporting student learning. It expresses the view that university/college students need to have educators who act as 'superheroes' seeking to understand their students' views of the world and their learning experiences within it.

The author explores how a range of 'secret weapons' namely learning and communication technologies have been used by a reluctant adopter (not a superhero) to simply and effectively engage and empower students in the classroom. The overall aim of this approach was to offer students an opportunity to learn in a way that will put them in a strong position to be successful not only at university but also in their life ahead.

Beginning with a discussion of the current UK learning context and the power dynamics that exist within the university classroom, the article then goes on to offer practical and pragmatic advice on using a specific range of technologies to support student learning. These technologies are a student response system called Socrative (available as a free smartphone app); Google Sites (a free website building tool - used for enhancing case studies and designing authentic assessments); tablet computers and audio (voice) feedback recorders.

The paper concludes with a range of general tips for those adopting new technologies. These include involving the wider team (fellow academics and learning technologists) as well as students. Additionally it encourages thinking about pedagogical and practical approaches that need to be considered when adopting new technology either in the classroom or in assessment.

Discussion

Perhaps this paper would be better presented as a graphic novel as it involves images of superheroes, secret weapons and a population in need of rescue. So who needs rescuing and what is the battle?

The distressed inhabitants of my 'Gotham City' are 'undergraduate students'. So who exactly are they? Well they are individuals who will be leaving university with the same amount of debt as my first mortgage, so they are brave. They also have a wealth of experience to contribute. I teach in a Business School and many of my students already have a lived experience of the world of work. They also know more about what it is like to be growing up

as a young person today than I do and for my international students, they know more about what it is like to grow up within their home culture.

So if they are brave and have a wealth of knowledge, what is the evil that they are battling against? For me it is the traditional approach to pedagogy that exists in much of our university teaching. There is something of a problematic power dynamic - an 'evil' to continue the superhero metaphor that I think needs to be addressed. To offer some insight, one of the subject areas I teach is organisational behaviour where we look at subjects like Power and how power dynamics impact upon behaviour in the organisation. One of the models we use is that of French and Raven (1959) which in its simplest form identifies 5 sources of power:

- Coercive power, where those with perceived power can use punishment for control.
- Reward power, where valued benefits are offered for control.
- Expert power, offers special skills or knowledge as the dominating factor.
- Legitimate power, derived from holding a formal position.
- Referent power, a form of power based on something rather like Charisma.

I want to share a story from my classroom that clearly illustrates how these 'powers' play in students' minds. During a tutorial I ran with about 20 students the following occurred:

Michelle: *'Who has coercive power in the classroom?'*

Students: *'You do.'*

They went on to explain I set the exams, marked the work, and in their view controlled their award.

Michelle: *'Who has Reward Power?'*

Students: *'You do.'*

For the same reasons stated above.

Michelle: *'Ok who has Expert Power?'*

Students: *'You do.'*

They explain that as a senior lecturer they saw me as a subject matter expert.

Michelle: *'What about legitimate power?'*

Students: *'Same reason.'*

More specifically they meant my university role.

Michelle: *'Who has Referent power?'*

Students: *'Sam.'*

You need to know that thankfully Sam was an engaged student who modelled excellent classroom behaviours that the rest followed (maybe the 'Boy Wonder' to my Bat Woman?)

This scenario has played out for me time and again, although the instance I cite is the only one where I didn't get nominated so Sam must have been rather special. So, why is this an issue? Well if you think about school teachers, they may be able to exert a degree of coercive power but they are at the mercy of examination boards who set questions and independently mark work when it comes to reward power. It also troubles me that students are conditioned to see me as the expert. As described earlier, they have a lot of lived experience that offers them a genuine perspective on the subject and for me a participatory role within the classroom which should offer them some legitimate power. So how are they conditioned to think this? Well for one, there is the formal lecture where they are asked to sit and listen to the 'expert' as it suggests they have no formal valuable contribution of their own to make. It is also important to acknowledge that the majority of my undergraduates come from the UK schools system that offers them the opportunity to voice their opinions and gain feedback from their teachers every day. After departing university they will transfer into a world of work which will have a similar dynamic, where they are able to voice their opinions and gain feedback. So why then do universities persist in using approaches like large group lectures to help their students learn? Indeed, evidence from Freeman *et al* (2014) suggests that STEM teaching relying on lectures rather than active learning increases failure rates by 55% (there is a caveat though, active learning appears most beneficial in classes whose size is less than 50).

So what is my mission? To liberate my population and give them the voice and learning experience they deserve. So what are my superhero qualifications? None. I'm not a superhero, I'd look awful in Lycra/Spandex! However, I do perhaps bring to my teaching a different perspective on what good learning should look like. My background is 20 years as an HR consultant where I designed and delivered learning and development interventions for UK and international private and public sector organisations. The learning opportunities I developed were based on the principles of active learning where participants actively engaged in tasks and considered the implications of what they had learnt for their own professional practice.

Voices have existed for some considerable time advocating that this approach to learning should be used in Higher Education (see Bonwell and Eison 1991).

Additionally, my consultancy practice involved working collaboratively with those that commissioned and participated in the learning interventions that I developed and delivered. There was an equal balance of power where those commissioning/learning had significant organisational insight while I brought along 'new ideas' for consideration. I found this approach (which could be characterised as collaborative learning (eg Bruffee, 1995)) works. The participants and I worked together to achieve a new level of understanding .

So having established the citizens of Gotham City that need rescuing and the 'evil' that I'm fighting against now is the time to unveil the 'secret weapons': a range of technologies that have offered me the opportunity to create dialogues and collaborative learning opportunities that really unleash the potential of my citizenship.

Before I go further I have to confess like any potential superhero I have a weakness, my Kryptonite... technology! I have a mobile phone that is rarely charged (I find it controlling - perhaps a reaction to my consultancy days!), I don't have a 'tablet' computer, and I don't

Tweet (although that might have to change next!). For me technology is a 'necessary evil' that needs to be embraced if I am to create a Gotham City where all citizens are safe, valued, and able to be the best they can possibly be.

So what technologies do I use?

Socrative

Socrative is a student response system - simply put a tool where students can 'voice' their opinions during a large lecture. It is available as a free smartphone application (app) that enables lecturers to design questions that require either multiple choice, true/false or free text answers (where students type in their narrative response to a question). In my case I have used it successfully in lectures with over 300 students, where the weight of the 'crowd' bears down on the learners and prevents all but the extremely confident from engaging in discussions/providing feedback on their understanding. Geski (1992) agrees listing elements of the physical environment, a less 'personal' experience and large student numbers as all constraining student involvement. In all honesty, where I have 50 or 60 students, having developed a supportive learning context, I find it easier to engage with the students directly rather than use technology but when numbers extend into the hundreds that is where I feel a need to change my approach and introduce technological support.

I like this software for a number of reasons. First, as explained above, it is free, an important benefit for any university. Second, it offers more options than some voting systems where students are only able to answer multiple choice questions. Third, it automatically produces spreadsheets of the answers given, so that as an academic I can check overall understanding of the student cohort. Forth, it helps to address three essential learning processes, that are challenged by the use of a large lecture environment. These are identified by Trees & Jackson (2007, p22) as 'practice, feedback and active involvement'. To this list can be added collaboration (Crouch & Mazur, 2001) and self assessment (Boyle & Nichol 2003; Stuart et al 2004).

Importantly, I feel that it gives my citizenship a voice and provides an opportunity to liberate all that lived experience they bring to the lecture theatre. I particularly like the fact that it provides a voice not only to the confident students, but also to the shy and the international student (who is reserved about their spoken/written English language). Stowell & Nelson (2007, p257) suggest that 'clickers' (voting keypads and response cards) can 'create an avenue for interaction with students who might be too shy to speak or even raise their hands'. I also want to suggest this approach can also support the dyslexic student (who might not want to write on a flip chart). I believe therefore it encourages responses from a wider diversity of students.

Colleagues have expressed reservations about the use of smartphones and whether they promote a degree of exclusivity. To prevent this happening, the approach I take in lectures is to send out a question and then ask students to answer them as pairs or small groups should they wish - this means that all students have a chance to voice their opinions, either personally or by engaging in a discussion with others before agreeing what to submit. They therefore have an opportunity to 'practise' solving the problem with the help of others (practice being the first of Trees & Jackson's (2007) learning processes); it also addresses the collaboration aspect highlighted by Crouch & Mazur (2001). Indeed, Preszler et al. (2007) suggest that the use of student responses systems alongside this co-operative learning

approach improved students performance on exam questions. So, from my perspective, it is not simply using a student response system, but embedding within its use a variety of pedagogical approaches, e.g. student collaboration and discussion that are key to getting the best from this technology.

Another feature of Socrative is its ability to generate immediate 'feedback' to the student, feedback being the second of Trees and Jackson's (2007) learning processes. So in the above example the student selects their chosen response and then feedback appears immediately on the screen of their mobile phones suggesting what might have been the best approach, thereby offering a self-assessment opportunity, a further benefit of student response systems as identified by Boyle & Nichol (2003) and Stuart et al (2004). This feedback facility would be much approved by Gibbs et al (2003) who advocate speedy feedback as a way of enhancing learning.

I primarily use Socrative to teach employability in a large lecture environment. Like all technology it is important to think about how you're going to use it. I try and make the use of the software engaging and therefore encourage 'active involvement', the third of Trees & Jackson's (2007) learning processes. For example, I create questions that provoke thinking and a smile such as:

My email address...

1. Used to be cool
2. Is slightly rude
3. Is short and professional in tone
4. Takes 3 weeks to type
5. Doesn't matter as I never check it

This all might sound really complicated, but it genuinely is not. It is a very simple undertaking to build a questionnaire, select a correct answer (if there is one), and type in some feedback. These questionnaires can then be stored and shared, so are accessible to other 'heroes' in the university (and indeed through the Socrative community).

The technology enables responses to be seen on the lecture theatre screen. I find this particularly useful when I ask questions that enable some degree of cohort benchmarking. For example, I'll ask a scaling question about something like volunteering, leadership evidence or work experience and ask students to rank themselves. It is then possible for them to see how they could be ranked by future employers eg. 'there are at least 50 people in this lecture theatre, on this course, who have more volunteering on their CV than me - I need to take action...'

All superheroes have to fight a 'criminal' element, and there is a little of that with the use of Socrative. The software allows narrative responses to questions to appear on the lecture theatre screen in 'real time'. This means there is little control over what appears. For example, I asked students what three words appeared in the headline statement of their CV so they could understand there was little differentiation in content for employers as they are all saying pretty much the same thing. More than one of the responses brought the house down: 'almost fully nude' was one of my favourites but not appropriate to share! So with narrative questions I tend to capture answers on a loaned iPad. This means I can ignore anything inappropriate while still sharing the funnies and the learning. The students just seem to take it

for granted that I'd do that, when I told them why! I also use this iPad supported approach when I have guest lecturers. During the lecture I ask students to send down their questions and then I'm able to paraphrase some to a more appropriate format e.g. from 'It's wrong of your company to ask for 300 UCAS points' (this relates to school exam results) to 'Why does your company ask for 300 UCAS points and is there any flexibility in that?'

In lectures I try and introduce as much interactivity as possible. Again in employability, I hand out a sheet with a number of examples of paragraphs detailing the extent of company research in covering letters. Students then have to discuss the samples in small groups in the lecture theatre and then submit to Socrative their preferred paragraph and why. This makes for a much richer debate and understanding than just displaying a 'good' example on the screen as it helps me to understand how the students are rationalising their decision - something I would not have known otherwise. This then informs my teaching and what will happen at subsequent seminars.

Student response to my use of this software has been entirely positive. I have asked the question about future use in lectures and not one student has said stop. Indeed about 60% have said they want even more and the remaining 40% have said I've got it 'about right'. Feedback comments include:

'This is the only lecture I don't feel like I'm falling asleep in because we are involved in it. The only lecture I like to come to!'

'I like that it's anonymous and makes it more interesting' 'Interactive, informative but also a bit of a laugh'

Finally I use Socrative to encourage students to ask questions at the end of the lecture about the subject under discussion, and to provide me with feedback on their learning experience. Both of these help me to reflect upon my own practice and to respond more appropriately to their needs.

In summary, I suggest that Socrative is a very powerful secret weapon as it can be used to:

- Make learning fun (my students suggest this encourages their attendance and engagement)
- Facilitate student discussions
- Promote collaboration (with me and guests)
- Deliver timely feedback to students
- Offer everyone a voice (including the shy, dyslexic and international student)
- Gauge understanding (through immediate lecture responses and later spreadsheet reports)
- Obtain feedback from the students about their learning experience

Next on the 'Bat Belt'...

Google Sites

Google Sites is free software that allows the user to build simple websites. It also offers a degree of scalability as apps are available to extend the functionality of the website.

I recommend the use of Google because it is familiar to the students and in the case of my home institution it is supported by University systems as we adopt Google for Education technology. So how do I deploy this weapon? Two ways; the first relates to case studies.

Google Sites - Enhancing Case Studies

Much of my pedagogical practice aims to use simulations to 'challenge students to explore changes in their mental maps and theories' Romme (2002). As part of a simulation I ran, rather than create a 'flat' paper based case study, I elected to create a 'Company website' to illustrate the culture of the company, its history, product range, organisational profile, key players etc. Cultural elements were illustrated by things like articles 'celebrating fun run success' and pages where key players in the case study had biographies etc. It made it such an authentic experience that one of the Public Relations students asked if we could put her in touch with 'the company' so she could help them to develop their online presence still further (so that says little about my design skills but a great deal about the authenticity of the experience).

In all honesty the first time I did this I had help from a learning technologist, as this was new to me. Now, with increasingly simple and intuitive technology, I would be happy to do this myself. Students found using the website an engaging experience and this was captured during formal student evaluations where a year on year comparison showed this new approach secured significant improvements in student scores related to 'Learning resources' and 'Enjoyment of the learning experience'.

My biggest tips are plan your content before you upload it and then be prepared to fiddle a bit. In addition, there are lots of helpful videos both on the Google sites pages and via YouTube that can offer simple guidance. My final tip is not to be scared. It is possible to start from scratch and do something amazing, as detailed in my second example below, which relates to non-IT students building websites (using Google Sites) for assessment.

Google Sites - for Authentic Assessment

Salas et al (2009) suggest that SBT (Simulation Based Training) gives 'students the hands-on practice they need before they enter the corporate world' (Salas, 2009 p559). This view is obliquely supported by Lombardi (2007) who suggests, authentic learning needs to be accompanied by appropriate assessments.

So how is this to be achieved? I have a cohort of first year undergraduates studying for an Honours Degree in Business and Human Resource Management (HRM). As part of this degree students in their second year apply for a year-long (employed) industry placement which will take place in their third year. After this they return for a final year to complete their degrees.

I wanted to make sure that by the beginning of the second year my students were able to demonstrate employability related skills to future employers. To achieve this we created an authentic first year assessment which requires students to work together to develop a company HR Intranet site (using Google Sites). As part of this build they individually

develop specialist content in a specific area of HRM. Their areas are required to focus on the needs of the target audience (line managers) and should contain appropriately cited research, and rationalise its use (so the academic content is there).

This is the one area of my suggestions where I really do recommend that you have external support - Robin to the rescue! We used our learning technologist to create user guides, deliver two technology based sessions, and create a blank website template for students to use (easily accessible from the University's virtual learning environment). We also created a kind of 'virtual help desk' where technical questions that were not answered by online guides were resolved by the learning technologist.

One of the benefits of this assessment was that we were able to view student's work as it was developing and provide them with formative feedback. Another particularly pleasing factor was that there was a broad spread of marks between team members as students were evaluated for the design and content of their own specialist area within the team developed company website. Simply put, we had found a way to overcome an unfair distribution of marks due to social loafing, an issue identified by Dyruud (2001).

The benefit we were striving for in this new assessment - is beginning to become apparent. We had a first year student obtain a high quality summer internship based on his website and another student talk about how they'd demonstrated their website on an iPad during an interview where she was successful in obtaining the job. There is more research to be undertaken but these initial insights suggest that this approach might well be worth considering.

The next recommendation is hardware that rather than software and comes with its own resource implications.

Tablet computers

'Not another flip chart...' I have heard students sigh when the flip charts are brought out again for yet another 'do and debrief' exercise, so I looked for a way to make this type of experience more engaging.

I designed a seminar that required students to 'role play' new graduate recruits who were employed on a company's graduate scheme and who had been invited to a development centre where they were to be assessed for the company's 'Stars of the Future' talent development programme. This development centre required them to work in a team for one hour to produce a (subject specific) presentation that would be evaluated by assessors.

To complete the task they were given an iPad and two iPod Touches per team, 4 paper-based research resources and the following advice:

- *The content of your presentation is the most important part - plan your content before you begin playing with the technology*
- *The paper-based resources should act as the starting point of your consideration and investigation - not the end*
- *Less is definitely more - minimal content on screen, means that there is more focus on you and the debate*

- *Minimise your animations- simple, consistent animation will display your message more effectively*
- *Vary the delivery - some slides will need to be text, some can be displayed better as images/ diagrams - think about how you can vary the experience for the audience*
- *Bullet points are easy to drop in - think outside the box of other ways you can list / display information*

To help you think about appropriate technology you might like to consider the following (however the choice is entirely yours as long as you can access your presentation via the Internet):

- *Prezi*
- *Haiku Deck*
- *Google Docs*
- *Keynote*
- *Padlet*

The design and briefing deliberately put all of the technological emphasis on the student as I had academics on my teaching team who were incredibly nervous about the whole experience and were fearful of the technology. When I explained to them that all they had to do was watch the final presentation and give 'development centre feedback' they were much more relaxed.

The biggest issue I found was one I simply didn't anticipate, namely that some of the academics on my team were not 'Superman' or 'Superwoman' and the physical transportation of iPads/iPods and paper resources to a seminar was a challenge. This year our learning technology team have invested in shopping trolleys to help overcome this physical issue!

Overall the feedback on this session from the academics and students was extremely positive. This extract from a colleague teaching one of the seminars illustrates the type of feedback I received:

'All the students were engaged in the activity (I have a significant number of Chinese students in the class and although I needed to spend a little more time explaining it to them, they grasped it and got on with it.)

What I was particularly impressed by, was how it engaged even those students (I have one in mind) who if not managed carefully has the potential to be disruptive. This student actually took a lead in discussions and the presentation. So in that sense it worked very well. Having technology to play with seems to have made a huge difference.'

Audio Feedback

I am passionate about audio feedback (where students are given a voice file containing feedback on their assessment). I won a UK Higher Education Academy individual teaching grant to research the subject and its impact upon mature as well as traditional undergraduate students and those with a learning difficulty. There is a strong research base that advocates the use of this approach, for example the work of Anne Nortcliffe and Andrew Middleton who have both published extensively in this area.

The results of our research suggested that audio feedback had a significant role to play particularly for those with learning difficulties and that it also worked for mature students. Here are two illustrative comments from students on their first experience of receiving audio feedback:

'That is the best feedback I have had... There is nothing worse than working your backside off for months writing an essay only for it to receive a good or bad grade and it not be explained why. Audio is definitely the way forward...'

'I just wanted to give you some feedback about the audio you provided for my assignment! Although it felt slightly strange hearing a disembodied voice (!) I found it very informative and think it was much more detailed and useful than receiving a few written lines. You raised things which I hadn't previously considered which I can use to improve my future assignments!'

So how easy or complicated is it to use? I have found academics that are really fearful of the process begin to relax after their first 3 or 4 recordings and enjoy being able to offer students the detailed feedback they had not been able to produce previously. Additionally, some academics found it saved time (given their typing skills perhaps). All found the process of uploading the audio files into Grade Centre (a central university online system for marking) simple (particularly if they had a good broadband speed at their upload location)! Such is the powerful nature of the experience for some academics that I have seen a 'reluctant first time user' change into an 'audio champion' who launched a project for her subject group to adopt this approach in a very wide range of modules.

There are however lessons to be learnt about the size of the file, authenticity of assessor voice, etc. This has led to the creation of a tip sheet I use for briefing academics new to delivering audio feedback, the contents of which I share below:

- *Read the script, make some brief annotations to identify useful examples for feedback (i.e. aspects that relate to the key marking criteria). Why? It takes too much of your time to write out the feedback and then just read it into a machine and recordings become too long and repetitive if you record as you mark (even if you pause as you go along!).*
- *Start all recordings with the student's name and number (makes it much easier to check which file you're renaming / uploading at a later stage).*
- *Say hello and introduce yourself then suggest to the student that before they listen any further they should pause the recording while they get their work in front of them (as it will make the feedback more meaningful).*
- *Be authentic - we've found out that when you don't sound like the classroom you - it becomes a challenging experience for the students.*
- *Try not to become a telling-off parent but feel free to use words like disappointed if you genuinely are, just watch your tone of voice, it should be adult to adult communication not parent to child.*
- *Remember there is a pause button so use it if you want to think about how to construct some challenging feedback.*

- *Do not record the grade in your audio file - instead capture it on the marking sheet and upload that - this helps with the moderation process as you can change grading simply on the sheet but to edit it out of a recording would be time consuming.*
- *Aim for around 3 minutes of recording - 5 at a maximum - no more.*

One final thought with audio feedback. Don't limit it to summative feedback, consider using it to record formative discussions with students. I have found encouraging students to record their dissertation discussions helps them to reflect a lot more on the content of the session as audio recording means they can relax a little with the note taking and instead concentrate on the discussion. Additionally non-native English speakers are able to listen to the recording more than once to help them with their understanding. My key suggestion here is to ask the student to come along with their own device - they can then record the discussion and take it away and there is no extra administration for the academic.

Adopting new technology - some tips...

So I don't see myself as a superhero more a female 'Inspector Gadget' who tends to fumble with the technology and somehow gets to a good outcome! Reflecting on this I think I am a bit of a risk-taker and I recognise that it is not the comfort zone for all academics or indeed academic institutions. Having said that, it needs to be acknowledged that many superheroes have gone through a level of training before they become comfortable with a new skill, whether it's the Xmen or Luke Skywalker with The Force (is he a super hero?) I can understand the challenges, I would hate to risk a students' grade because of my befuddled use of technology, so I tend to manage risk as best I can by adopting the following approach:

Identify a philosophy that suit you... for example:

- Don't see technology as separating you from the student but see it as bringing you closer together.

Involve the team

- Talk to your technology experts – that's what they're paid for and they are often thrilled to be involved! I have been lucky, my technology experts have also been qualified educators and therefore highly experienced in instructional design. If they are not, then it is up to us to ensure that the pedagogy leads where we want to go, and that technology supports us on this mission.
- To coin a phrase 'Feel the fear and do it anyway' – but remember you have to deal with everyone else's fear too! This can be a challenge when you are part of a large teaching team. Sometimes the best start is to agree to a 'pilot' rather than a wholesale change.
- Acknowledge to yourself and others that it does take extra effort to get things up and running but once you're over the initial development time you'll often see a very strong positive outcome.

Work with the students

- Be honest with the students during trials or in the early days of adoption – they can be incredibly supportive (particularly in low risk situations).
- Take time to explain the pedagogy to your students

- Avoid trying something new with the final assessment for final year students - there is too much risk for everyone. Try it earlier in the degree.
- Ask students for tips and feedback - how could this be improved? Think pedagogy
- Consider the pedagogical benefit. For example Socrative and speed of feedback.
- Be careful about innovation for the sake of it. Graham Gibbs (n.d.) suggests that care needs to be taken with the amount of novelty in assessment, he asks assessors to consider where students get the opportunity to improve their performance if a novel approach is only used once.

Think practicalities

- Consider accessibility if you change location. For example, some of these approaches may not be suitable for different international contexts, where device access and WiFi may be limited, broadband slow (or non-existent) and different charges exist for use of mobile data and SMS.
- Think about how you are going to get the physical resources to where you need them.
- Get some help to test whether your university infrastructure supports your use of the technology.

Reviewing the list above, it does not suggest to me a list that belongs to a superhero just to someone who wants to make a positive difference in a world that requires a great deal of pragmatism. Like all good video games, my suggestion, pick a weapon that appeals, aim for a level of mastery and then play!

References

Bonwell, C. C. and Eison, J. A. (1991) Active learning: creating excitement in the classroom. ASHE-ERIC Higher Education Report No.1 Washington, DC: The George Washington University, School of Education and Human Development. Available from: files.eric.ed.gov/fulltext/ED336049.pdf. Downloaded 10 July 2014.

Boyle, J. T. and Nicol, D. J. (2003) Using classroom communication systems to support interaction and discussion in large class settings. *Association of Learning Technology Journal*. Vol. 11. No. 3. pp. 43 - 57.

Bruffee, K (1995) Sharing our toys - Cooperative learning versus collaborative learning. *Change*, Jan/Feb, pp.12-18
 Craig, E. M. (2007) Changing Paradigms: managed learning environments and Web 2.0. *Campus-Wide Information*

Systems. 24(3), pp. 152 - 161.

Crouch, A. H. and Mazur, E. (2001) Peer Instruction: Ten years of experience and results. *American Journal of Physics*. Vol. 69, No. 9. pp. 970 - 977.

Dyruud, M. A. (2001) Group Projects and Peer Review. *Business Communication Quarterly*. 64(4), pp. 106-112.

Freeman, S., Eddy, S.L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H. and Wenderoth, M. P. (2014) Active learning increases student performance in science,

engineering, and mathematics PNAS 2014 ; published ahead of print May 12, 2014,
doi:10.1073/pnas.1319030111

French Jr, J. R. P. and Raven, B. (1959) The bases of social power in Cartwright, D. (ed.)
Studies in Social Power. Ann Arbor, MI: University of Michigan, Institute of Social
Research, pp.150-167.

Geski, J. (1992) Overcomin the drawbacks of the large lecture class. College Teaching. Vol.
40. pp. 151-155.

Gibbs, G. (n.d.) Improving student learning through assessment and feedback Available
from: <http://www.birmingham.ac.uk/Documents/college-eps/civil/news/aced/graham-gibbs.pdf> Last accessed: 10th September 2104.

Gibbs, G., Simpson, C. and Macdonald, R., (2003) Improving Student Learning through
Changing Assessment - a conceptual and practical framework. EARLI Conference, Padova.
Available at: <http://www.open.ac.uk/fast/pdfs/Earli-2003.pdf>. Last accessed: 05/06/14.

Lombardi, M. M. (2007) Authentic learning for the 21st Century: An overview. Education
Learning Initiative - advancing learning through IT innovation. Available from:
<http://alicechristie.org> Last accessed: 27th October 2013.

Preszler, R. W., Dawe, A., Chuster, C. B. and Shuster, M. (2007) Assessment of the effects of
student response systems on student learning and attitudes over a broad range of biology
courses. CBE - Life Sciences Education. Vol. 6. pp. 29 - 41.

Romme, A.G.L. (2002) 'Microworlds for management education and learning'. Available at:
www.unice.fr/sg/resources/articles/romme_2002_microworlds-management-ed-learning.pdf [Accessed 26

October 2010].

Salas, E, Wildman, J., and Piccolo, R. F. (2009) Using simulation-based training to enhance
management education.

Academy of Management Learning and Education, 8(4), pp. 559 - 573.

Stowell, J. R. and Nelson, J. M. (2007) Benefits of electronic audience response systems on
student participation, learning and emotion. Teaching Psychology. Vol. 34. No. 4. pp. 253 -
258.

Stuart, S. A. J., Brown, M. I. and Draper, S. W. (2004) Using an electronic voting system in
logic lectures: one practitioners application. Journal of Computer Assisted Learning. Vol. 20,
pp. 95 - 102.

Trees, A. R. and Jackson, M. H. (2007) The learning environment in clicker classrooms:
student processes of learning and involvement in large university-level courses using student
response systems. Learning, Media and Technology. Vol. 32. No. 1. pp. 21 - 40.