

Augmented didactics in Kindergarten12 education: An Italian Case History

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Abstract

This paper describes an experiment in 'augmented didactics' made in Italy in 2012 and 2013 and has the aim to suggest a set of tools and actions to enlarge the learning offer for students and the evaluation spectrum for teachers in secondary school with 11-13 years old students.

This experiment tries to build solutions in which the formal relationship between the roles of teachers and students changes radically, to benefit natural relationships between person and person, between person and group.

The augmented didactics approach has been applied to a little set of current topics in secondary school first degree in Italy: music, visual art and mathematics. But we started with an extra discipline: sociology. This subject allows reasoning with students on behaviours and relations, on attitudes and prejudices; and thanks to social network we have analyzed them like objects.

We are working to apply other formats for other subjects: history, geography, natural sciences and we are refining current formats in order to spread this approach in other schools.

The first part of this document describes formats on which is based the experiment, achieved through the use of the most popular social networks, mobile technologies, and free access to cloud services and APPs.

The second part tells the initiatives carried out with children during the past two years with some feedbacks by teachers and students and it suggests some possible evolutions.

Keywords: Augmented reality, disruptive technologies, collective intelligence, developing communities.

Introduction

My job as coach and change manager of public and private companies allows me to check daily and directly the impact of digital and mobile technologies in the learning process of adults.

Reading the book *Disrupting Class* (Christensen, Curtis, Horn, 2011) and some news about interesting projects made with students in UK and Ireland (Kennedy, 2012) an idea is born to do similar experience in an Italian public school.

The aims were:

- to verify the impact of digital and mobile technologies in the education for Kindergarten12;
- to suggest ways to augment available disciplines and tools.
- to bridge the digital divide concerns means, methods and styles of communication are the adults who have to fill this gap, recognizing students experience and authority in use and application of technologies.

With the help of boys and girls we have made an inventory of technologies and applications they use every day to communicate with each other and with people who they have not yet met personally, but with whom they share interests, games, contents.

Thanks to the support of a teacher and the enthusiasm shown by students and parents, it was possible to produce a cycle of supplementary lessons.

We wanted to highlight that technologies - if properly dosed - assist in the development of different aspects of personality and foster greater involvement by young people, who offer their full and enthusiastic cooperation in construction of their training process.

Augmented Didactics Formats

Social Networks and Personal Relations – how we are changing the way we communicate

The first format concerns social networks and tries to bring out how new technologies are changing the way we communicate, to relate to outside world, leading us to redefine boundaries between real and virtual environments.

Annoyed by 'gossip' that circulates abundantly on the web, we often forget social networks are born from old communities of programmers and web enthusiasts who exchanged chunks of code, small programs that solve small problems... creating a real evolution of collaboration and knowledge exchange processes. (Schweik , 2006).

Social networks therefore advantage new generations in socializing with a lot of people, sharing different cultures and problems, common passions and interests: collaboration is immanent in our lives and new technologies can encourage boys and girls to co-create their own education (Levine, 2006).

The program involves teaching and non-teaching staff, parents and children. It provides for parents and teachers a range of useful information and main principles of social networks, while for students suggests customized contents and concepts on which they can make assessments and insights, according to their taste and style. In this way students can develop their self-esteem properly (Yiamouyiannis, 1998).

Exercises and presentations are carried out with students to bring out their creative and relational potential, developing their curiosity for an instrument used too often in a

compulsive way. It is the boredom that flattens - young people as well as adults - to use technologies without any purpose but to use them. Stimulating curiosity and sharing potentials and pitfalls, the use of technology becomes more interesting and challenging.

Although we prefer to organize lessons involving parents and children together, during our experiment the first class of meetings are composed by parents and teachers of pupils involved in this project. And the focus was on these following topics:

- What are Social Networks?
- How can they influence and manipulate pre-teens?
- How much is changed the communication process over our 12 years?
- How much is changed the perception of reality through digital media?

The second set of meetings has been built with students, with all the second classes at the same time, sharing their experiences and their knowledge in the field of software, hardware, gaming, social networking and content management systems:

- What technologies do you know?
- What social networks and APPs do you use?
- What do you do with your mobile devices?

Information, games, music, pictures, comments, etc. Are they able to describe yourself? Technologies are simply a 'commodity' for digital natives and they show more interest for solutions they can build with technologies.

Through these points students have been involved in a discussion about their behaviours, relations and ways to communicate in different environments and with different people.

Art&Tech: dream, see, do, add and continue

This format is focused on solutions in which creative act and technical expertise converge.

Starting from the national guidelines for K12 education (<http://www.indicazioninazionali.it/J/>, 2012) on the subject 'Art and Image', the lessons are complemented doing photos and videos with smart-phones and tablets, using free APPs for drawing, for image processing and for browsing what others people have already shared on the web.

This combination of traditional media with digital tools adds impetus to educational activities:

- in making visual arts and plastics, creating works dealing technology as a simple material or as a working tool in preparation of a 'master-piece'.
- in designing technology services or products (mobile phones, tablet, game-devices, etc.) or applications (user interfaces, icons, graphics for games or websites, videos, etc.).

Starting from seeing and sharing of abstract concepts students will get results and aggregated them to create a single artistic synthesis. Specialisation (i.e. knowledge of one or

more techniques), creativity, synthesis and collaboration are four talents we can explore and develop through this kind of format (Gardner, 2007).

Their work will be the product of individual contributions and collaboration capabilities, which brings together technical expertise and creative energy. And still in this case, students feel themselves as creators and controllers of their learning process.

MusicAPP: select your own touch

The idea is to let students free to select musical instruments adding mobiles and APPs in their panorama.

The aim of this format is to witness the evolution in the way we think about music and in which we transform thoughts into music.

Starting from their own tablet or smart-phone, students can select solutions to listen, mix, synthesize and transform music into drops and segments, into spectra and colours.

Through mobile and digital technologies we amplify the way we learn to play and compose sounds, using different metrics and symbols. We have other languages and other ways to understand music: without notes, staff and clef.

Music is one of the areas in which digital technologies have brought a disruptive transformation. This transformation has already begun many years ago: from Napster's free music to Majors' DRM, from iPod and .mpx formats to Creative Commons and Music Co-Design Groups.

A technology is disruptive not only when it spreads itself rapidly, but when it breaks literally the schemes through which we have learned to interpret, encode and decode concepts and experiences (Christensen, 2003).

What is Music? We can describe it as an ordered combination of sound waves, and we can add that such waves are emitted with an instrument or acting as an instrument (singing). To play these combinations we have associated to waves some symbols (the notes) and names (C sharp, D, F, etc.), and finally a space (the staff) within which to place sequences and combinations of notes, creating compositions more or less complex, according to certain rules.

When there were no tape recorders, audio and video technology, we had no other way than to code by hand the wonderful music papers that otherwise would not have reached our times. Today we have technologies that allow change the logic of music composition and use, adding reference systems to those already known.

To describe the music from different points of view helps us to invent new reference systems for interpreting and disseminating music. What kind of tools to do that? Using tablet and smart-phone, students can select, download and test a very big set of applications for music: many functionalities are for free and enable to engage in

composition and sampling, in mixing sounds and noises. Even for people who don't know anything about music.

Recently Sir David Attenborough and the musician Bjork have made together a documentary about Music, Nature and Technology, in which they explain how many things link our passion for music with media and nature of sounds (Attenborough, Bjork, Minsker, 2013). Music definition has been enriched with other dimensions and we can perceive it by other senses: we not only listen music, we can also see it and touch it.

Mathematics: build a solution, share and try again

Starting from our national guidelines for K12 curriculum we tried, analyzed, and experienced a set of APPs and online communities. Through these technologies it is possible to structure and organize a program that covers what is currently done through conventional methods and processes (textbooks, lessons of teacher, exercises at home, feedback with colleagues, etc.) adding something extra.

In the first classes of Italian secondary school (i.e. sixth degree in UK), the mathematics topics are the following:

- Arithmetic: Expressions, Problems with numbers, Divisibility, Maximum and Minimum, Fractions and problems with fractions.
- Geometry: Elements of Geometry (segments, lines, planes), Corners and Complex Numbers, Triangles, Quadrilaterals, Cartesian system.

With students we began a search among APPs for study, learning and use of mathematics, and we found very interesting objects: new editing systems, presentation and content sharing platforms, games and simulators. We highlight SAT-Math (<http://www.freenew.net/publisher/?k=Gyrovation%2C+LLC>). This APP, developed in USA and available for tablet, does a free access to a community who uploads and shares lessons and exercises that can cover Italian guidelines for math:

- Numbers and Operations: properties of integers, arithmetic problems, stairs (maximum and minimum), squares of the integers and fractions, square root, fractions, percentages, and rational numbers.
- Algebra and Functions: algebraic expressions, distributive law, etc.

Rules and formulas are expressed very clearly and girls and boys can watch videos illustrating the resolution of real problems: they can see and use mathematics in everyday life.

The information is sequenced by degree of complexity. With this platform we cannot access lessons on percentages if we have not acquired - through listening to the lectures and the exercises - the properties of the integers.

With this APP, we can teach and learn mathematics using two languages: the formal one (Math) and natural one (English). To study a subject using another language is a non-trivial exercise and allows us to achieve two results at the same time.

The practical side of this kind of technologies makes math attractive for students. They are focused on defining and deciding the best strategy to solve a real problem, as they do when playing with their game devices.

Students can share their results, collaborating with others to improve the solution, which becomes the real result of their work.

This format combines Imitation and Trial and Error approaches and it is definitely more suited to young generations than assertive-assimilative ones, still characterizing many teaching styles.

Anyone needs to reinforce a concept, with these tools has a chance to see different shapes and ways to understand a problem and look for a possible solution. Each student can rewind, redo, reuse materials and adapt them according to his/her learning style and time.

Alongside this APP there are other equally interesting, whose creation mechanisms, replication and processing of content are similar. The main changes are in the way they present and organize information.

We invite you to try the APP Show-Me (<http://www.showme.com/>), a free online community where you can join directly through your Facebook or Twitter profile. You have access to the User Generated Contents, movies of classes of varying lengths made by professors and students on different topics. You can create and upload your contents and other people can start to follow you, sharing issues and solutions.

Feedback

Live and learn (Daniela Mascherpa)

I'm a teacher in a Secondary School of first degree in Italy and I teach English to girls and boys aged 11-13.

My pupils are called 'digital natives' and, obviously, I am a 'digital immigrant': there are plenty of things I can learn from them.

In 2011 Paola suggested that I joined a Facebook community. No sooner said than done!

At school many students found out my Facebook profile and they sent me a friendship request. I thought about the opportunity but I refused and created disappointment. I realized that tools like Facebook are powerful and I proposed to my School an educational project about social network.

It was approved, inserted in the POF (Educational Offer Plan) of our school with the title 'Social Networks and Personal Relations – how we are changing the way we communicate'. The format was dedicated to pupils of second classes (about 200 boys and girls aged 12 have been involved in these two years), and to their parents and teachers.

The educational aim was to give information about social networks: make people understand the creative and relational power it has, develop curiosity and awareness of its use to communicate in order to exploit its potential without falling into a trap.

Parents were very interested: only a few of them were experienced, the others were worried because they didn't know or didn't understand what their children did.

Only a few teachers knew or used social network but they were interested in 'getting in touch with it'. Teachers and parents agreed that their pupils' and children's skill was very high. Meetings with students gave us plenty of evidence about this.

The first one was a 'fact finding' meeting: through enquiries and statistics we realized that pupils communicated using various types of devices and applications.

At the end Paola gave them a task for the next meeting (one week later): 'Each of you will introduce yourself to the audience through new media... you can do it alone or in team... and you will have five minutes to show your solution..'

The topic was 'free' and some of the guys were 'wrong-footed': they would to receive guidelines or suggestions - may be to not fulfil them. At the end some of them were enthusiastic and had ideas, others wanted to work 'in groups' and there were also confused pupils who didn't know what to do.

During the week, works went on: there were boys and girls who met at home after lessons and proceeded and other ones who didn't work.

The day before the last meeting they were excited and worried: the next day each of them would have five minutes time to present his/her realization.

During the last meeting almost everyone had 'something': some pupils had drawings, others had slides, others streamed music and videos from YouTube and some of them created original presentations.

In particular two works were very interesting: a team made up of two boys produced a short film about themselves with music and songs by a friend. One boy showed slides in which he compared himself to animals and cars. We were amazed: they were a lively example of 'multiple intelligence' at work.

The meetings finished but everything went online. We created a private group on Facebook: Generazione APP. Each member of our school (current and past students, teachers, parents) could load and share various discussions, topics and contents. Many people joined the group immediately. And now, we are going on.

Fantasy - a conversation with Marta Sabbia

Marta Sabbia teaches 'Art and Image' in several secondary schools. Graduated in Painting at the Fine Arts Academy of Brera in Milan, she has worked in interior design and creation of

art objects from recycled materials. She attended several training courses to support children suffering from DSA (specific learning disorders).

We decided to test the Art&Tech format with one of her classes and the topic was How to Transform a Thought into an Object.

With boys and girls we watched a Lesson with Bruno Munari about Fantasy (Munari, 1992, <https://www.youtube.com/watch?v=yZqE8h3hPPk>) and we extracted some concepts to share and develop: fantasy, imagination, creativity, innovation and invention.

Then we asked the students to give us their own definition of Fantasy through their favourite media: a drawing or a mind map, a phrase or a graphic sign. They may select the most appropriate representation to explain their vision of this concept. And they had 20 minutes only to give us their solutions.

The following conversation contains some evidence in student behaviour using technologies:

P: Marta, we have seen the initial reaction of many students was of refusal, almost expecting to have more detailed information or guidelines ... and when you explained the approach with which they shall deal this activity, they seem to me more relaxed and produced interesting things ... How technologies can help them to express unreserved energy and creativity they have inside?

M: If your family travels and you have the opportunity to attend arts events, visit art exhibitions and museums, your luggage will be filled and you will have the opportunity to collect and imitate a portion of immense artistic world... This doesn't happen for all children and thanks to new technologies also those who cannot travel and visit places can browse and collect images, information, multimedia contents that do not replace the art-work itself but open up a way to art knowledge and experience.

P: Some of your pupils have difficulties in learning: how can unconventional methods and tools help them learn the same things with different styles and times? What reactions (positive and negative) could you find in these students?

M: Drawings or objects made by children with learning difficulties are always appreciated: it is not necessary they deliver an 'assigned work' in a 'due date'. For these pupils the work performed at school and at home using computer is a good opportunity to make progress and reach to be satisfied with their creativity. Through technologies they can make maps, diagrams, movies... they are more involved to learn with their computers.

P: During the meeting we have collected every single work done by your students commenting their tasks as masterpieces... we made some comparison with Picasso, Klee, Banksy, Pollock ... in this way we played the role of two art dealers who

commented first works of 20 emerging artists ... how do they react to this unconventional way to evaluate their performances?

M: My pupils have no idea of what modern art is. The references to masterpieces are unfortunately scarce and neglected since primary school. They were initially confused and listless ... but when they saw us playing a different role, even they have entered into their part ... and who had made a doodle just by obligation, he redid it again, because – he told us – ‘it fits better with the work carried out by others’. He has shown respect for us and for the comrades who had been taken seriously in the experiment.

P: Collected their personal works on a unique desk, we made a picture of each work using the iPad camera and then we used two APPs to assemble the masterpiece. The first one is PicCollage (<http://pic-collage.com/>) to put together all the photos and edit, the second one is HelloColorPencil (<http://www.raysoft.co.kr/>) to change shapes and background. When your pupils saw the final result, as the sum of the various parts they have done, what reactions did they have?

M: This activity was rather unusual, since the meaning of words: fantasy, imagination, creativity and innovation are abstract concepts they cannot see and touch. They are fast, and we have to learn quickly to help them in taking pleasure in all arts: painting, music, dance, photography, sculpture, etc. adding digital forms of expressions. They were curious, asked what ‘the expert’ Paola thought about that, some of them were surprised. We printed and hung it in the classroom: some students searched for their contribution among others and all liked very much their drawings collected together. And many students changed opinions about their own potential.

Back to School – students teach me about conflicts and collaboration

Through a selection - led by students - on digital media, the debate was focused on human relation and on how communication can generate or solve conflicts.

The following is a summary of their thoughts during the days spent together.

Communication between people often depends on these aspects:

- the Mood I communicate with, that immediately shows my state of mind
- the Way, understood as a formal language, I use to explain (speaking, writing, dancing, etc.) What I want to communicate.
- the Content of communication: it can be a simple thought or a complex dilemma.
- the Tools I use for communication: face to face, chat, Facebook, Messenger, etc..

The only thing that makes us different and equal at the same time is our personal use of these four elements.

The communication is never easy. And even when it is easy, it can change and become difficult: for instance, due to the birth of an internal conflict or a conflict with others, a relationship can become very hard. And in communication something is changing.

Anyway, everything changes: the environment changes, the plants change with the transition of seasons, our needs change in relation to environments we frequent. We change when we learn new things and when we make new relationships ... to adapt is difficult because it requires the strength to get out of the habit and the routine.

The conflict is a clash, it can lead to a war, brings with it the logic of struggle or threat, but a conflict is also an exchange of ideas, a comparison that can enrich people who think differently and moreover can collaborate exchanging and refining information.

An example of this transformation from conflict to collaboration is clearly present in sport: two friends who play Judo and challenge each other, they enhance their abilities during the fight ... just because conflict and cooperation are two sides of the same coin.

Conclusions

The spread of mobile technologies and online communities means that digital natives communicate in a very different way from ours and they required 'customized' paces, times and ways to maintain a high involvement in culture and knowledge evolution.

The knowledge and experience of students aged between 11 and 13 years in the field of technology is extremely higher than that of their parents and teachers. It is necessary to bridge the generation gap by creating different styles and levels of communication between teachers, students and parents: they are a real community, and social networks are their 'augmented place' to share, spread and imitate.

The traditional subjects become more attractive if communicated through unconventional means, which allow us to assign the student the role of 'experts in new technologies'. The student becomes someone who has to teach something in an environment that usually forces him/her to a passive assimilation.

The augmented formats give us a possible way to highlight talents, skills and attitudes that often remain latent, because levelled in a unique model.

New technologies allow teachers to broaden the field of observation and evaluation of pupils. Through digital data collected in social profiles teachers can verify the evolution of talent and peculiarities of each 'young person'. They can open the diaphragm to focus on individual learning solutions and progress.

Being digital natives is not just about knowing how to make better use of the technologies of previous generations, but it means to have a completely different approach to reality, communication and collaboration.

The use of PlayStation, Nintendo, and others, has provided them with a vision of reality and its simulations much larger than we have, and for them the distinction between nature and culture is less clear than in our heads.

While many adults think of a computer as something colder than the heat of the direct relationship, for a twelve year-old, smart-phones or tablets are simply communication tools. To make their medium hot (or cold) are their messages, their memes.

For many adults Artificial Intelligence is a mystery, for some even a threat. For children A.I. is simply a program that can 'imitate', 'simulate' the way we think and in fact it is like the programs used by large corporations to study our behaviour on the web, to suggest what to read, where to go, how to spend.

The network can teach our children an approach that we have forgotten for a long time: to collaborate, to exchange knowledge, to gift.

There are communities, entire local economies in Asia and Africa based and intended on cooperation. Because of depletion of natural resources we suggest to accelerate our cultural evolution developing multiple intelligences, able to work together.

Opening new channels of expression, girls and boys with specific learning disorders have definitely excelled in making original solutions, showing their skills in unconventional disciplines. It is therefore important to consider that through new technologies they will be able to learn with passion, selecting by themselves channels and alternative methods of communication.

Through dissemination of these first experiments we hope to be able to involve other Italian public schools, to develop and expand the formats and course materials.

The didactics around us are already changing in a radical way and in Italy we are not train the younger generation to adapt to the sudden change of environmental and social conditions in which the globalized world exposes us.

The lack of availability of funds in Italy for the overhaul and upgrading of teaching and non-teaching staff, leaves ample opportunities for self-organizing and self-learning.

We have a great opportunity to join forces to improve the educational system and cultural development of future generations, based on cooperation, reciprocity, fairness and transparency, focusing continuous improvement of the process of learning and cultural evolution of our whole society.

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The complexities and challenges of introducing electronic Ongoing Achievement Records in the pre-registration nursing course using PebblePad and hand-held tablets.

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This paper reports on a small pilot study aimed at eliciting the lecturer and student experience of using PebblePad to record the students' Ongoing Achievement Record (OAR) using hand-held tablets, at one university in England. Android tablets were purchased and attempts were made to transfer the OAR into the PebblePad system in an attempt to enhance the student experience of feedback from their via PebblePad, embed PebblePad learning technology in the practice component of the curriculum, enable the student to more readily engage in reflection and feedback with their personal tutor, practice education link and mentor, develop skills in the use of PebblePad and pilot the use of PebblePad in