

Preparing Didactical Designs for Learning to be Creative Using iPads

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Abstract: Creativity is socially constructed and is not an objective fact at all. How do people *socially construct* creativity in a specific context like schools; what does creativity consist of with regard to teaching and learning from the teachers' perspective and how can it be supported? From our projects, one in the field of creativity in higher education and a second about iPad-classrooms in Danish schools, we present and discuss didactical concepts with regard to 'learning to be creative' using mobile devices what we call iPad-Didactics.

Keywords: creative learning, didactical design, iPad-Didactics

1 The Social Construction of Creativity in a Context

The problem with the term creativity is that there exist a lot of different definitions and also contradictory meanings in the research field of creativity (e.g., Jahnke, 2011; Fischer 2011, Herrmann 2009, Watson 2007; Amabile, Hadley & Kramer 2002; Gardner 1993). For instance, the different authors discuss what and who is creative, e.g., the person, the product, the process, the environment; the individual great mind; a smaller group in interaction; a larger group, an organization, the society. Individual, social and collaborative creativity are some of those different concepts. Despite – or even because of – these manifold concepts of creativity, no precise definition of creativity is available.

To make it more visible, creativity for a firm which designs shoes or software programs might be different than creativity in sociology in universities or language schools. Secondly, researchers (e.g., Csikszentmihalyi 1996) argue that the idea-generating person is only creative when an external authority assigns the value of their creations. But we argue creativity is subjective. When a person thinks s/he is creative this is true for her although it does not necessarily mean that this idea is also a creative one for another person or group. Third, there is a difference between creativity (generating new ideas) and innovation (acceptance of new ideas).

We argue here that creativity needs to be always defined with regard to a specific context. Creativity is socially co-constructed. This led us to the following question: It doesn't make sense to ask what *is* creativity. But according to Berger and Luckmann (1967) "the social construction of reality", we scrutinize the following: How do people *socially co-construct* creativity in a specific context like schools; what does creativity consist of with regard to teaching and learning from their perspective and how can it be supported? Of course, you can ask the same question for any other context. In this paper, we study creativity in higher education and K9 schools using iPads.

2 Mobile Learning

In this paper, mobile learning is defined as teaching and learning supported by mobile devices; in this special case, iPads. We do not name iPads as tabletPC because tabletPC is not the appropriate word since it also includes specific laptops. A discussion towards "mobile learning" is done at another place (Jahnke et al. 2012).

When we started our research on iPads in schools and universities, people asked us, if there is a difference to laptops. And we said "yes" but without any evidence. Now, after a first pilot study, which is part of a broader research project, we know that iPads differ. They differ in many aspects but the most important difference is that the teachers we interviewed said "the iPad works", "you open an iPad and it works", "you don't waste time like with the laptops where the batteries were out of energy or the software wasn't installed". One answer by a teacher to our question why there is a hype around the iPads was: "There is no technology in there!" and she pointed her finger to the iPad. Of course, an iPad is made of technical elements and it is a pure technical device. However, with that quote we understood the teacher's point of view: they perceive the iPad as a device what is easy to use instead of a complex complicated device. That is one major difference to the laptop. Our research questions are:

1. RQ 1: What are the understandings of teachers towards creativity and the use of iPads in schools? Do they apply didactical concepts to foster creativity, designs for learning where students create something?
2. RQ 2: What do the teachers do in the practice of their classrooms? How do the teachers use the iPads in classrooms?

3 Methods

In two conducted projects, we applied different mixed methods. In the first project DaVinci (BMBF, Germany funded), we asked teachers and instructors in higher education about their imaginations of creativity. We created a framework from that database and checked it with an unusual online survey, n=300 respondents. We also asked students about creativity, e.g., if the teachers and students perception towards creativity match or not, to what extent.

The second project has started in 2012 in Denmark, where a whole municipality implemented iPads for app. 2,000 students and 180 teachers in 7 schools. We used classroom observations and teacher interviews, as part of a larger study. In April

2012, 13 classroom observations (45-90 mins. each) and ten interviews (ca. 60 mins. each) were conducted in five schools in Odder municipality in Denmark. The teaching subjects ranged from Language/Danish, Math and English, Art to Physics. The classes ranged from preschool to ninth grade with class sizes of 14 to 25 students. The classroom observations were based on the didactical triangle design 'teaching aims', 'learning activities', and 'different forms of feedback/ assessment' as well as the role of the iPads. The classroom observations were conducted by two to five researchers who took notes, photos and video recordings. The interviews were conducted by a total of three researchers and recorded. Data from the observations and interviews were first analyzed according to each classroom taught by a teacher (i.e. the observations and interviews for each case were combined) and then open coded (Bryman, 2008; Strauss & Corbin, 1990).

4 Results – Designing for ‘Learning to be Creative’

4.1. Six rubrics of creativity in teaching and learning

One empirical result of DaVinci is a conceptual framework for fostering creativity in higher education. When creativity is missing, six founded aspects together form the possibilities towards a creative learning culture where students are able to being creative: A learning culture in higher education gets creative by 1) fostering independent, self-reflective learning and critical thinking, 2) supporting the ability to work autonomously, 3) supporting (research) curiosity and increasing the motivation to learn, 4) enabling constructive learning where students design/create something, 5) fostering a new culture of thinking and changing perspectives and 6) enabling an learning spaces where students can develop original, entirely new ideas.

At MLCW12, to each of the six rubrics we provide empirical examples given by the interviewed instructors and teachers.

4.2. Exploring ‘creating creative learning’ in iPad-classrooms

In our study in schools in Denmark, we explored the teachers’ iPad-Didactics. At MLCW12 we present up to 3-5 examples, which make the multiplicity of designs for ‘learning to be creative’ visible. What the examples have in common is that the didactical designs focus on *action*; the students produce and create something.

(a) Transformative learning (math). The students in grade 2 (7 years young) got the assignment to design mathematical stories transformed from a given problem delivered on a piece of paper. Such an already existing mathematical problem was for example a) “minigolf – count the points” and b) “Mike was 5 when I was born. I am now 4 years old, how old is my older brother now?”. The students got the task to transform the given math problem into a new story. To make the transformation of existing ‘math stories’ visible (e.g., the principle of additions), the students got the task to create comics. They used the iPad to create the stories with the app called Strip Designer. The students used a template of Strip Designer and uploaded pictures from Google or from the camera roll (photos they have taken), they created speech bubbles

and included text. In the creating phase, a change of communication patterns took place, the students were more active and a communication between the pupils started and helped each other.

(b) Peer-Reflective learning (language). In this example, we describe a classroom of a 7th grade with 21 students (ca. 14 years old), 9 girls and 12 boys. The subject was Danish with the teaching aim to improve writing skills in Danish, the mother tongue of the students. The learning activity (assignment) to the students was to write something from their childhood and to reflect in peer-reviews their writing skills. The female teacher used Facebook for this task. In this example, the function of the iPad was reduced to deliver Internet access to Facebook.

Individual assignment: Students write a story about something that happened in their childhood. The story was written in Pages (app) and parts were copied into Facebook to get feedback from the co-students as well as the teacher.

Peer feedback: Students make comments on the stories of the others by using the functionality of the “comment” button in Facebook. Such reviews were guided. The students made their reviews by using those items from a list that the teacher created in advance. The teacher told in the interview that such a list is helpful to reflect both a) the own story, how it is written as well as b) to reflect the stories of the others. The teacher showed the guided list and the plan for the assignments. Thus, the students got an idea how to respond to their colleagues’ texts.

Then, a third step was to show some of the reviews in the classroom face-to-face. The teacher used the Smartboard to present some of the stories on Facebook. The last step was that the students revised their first draft based on the comments on the others and uploaded the final version into Dropbox.

(c) Personalized learning (physics). In the classroom of the physics, a male teacher and 15 students (8 girls and 7 boys) in the 9th grade participated. The main learning activity for the students was to design new experiments based on the prior knowledge the students gained the classes before. The aim was to apply the new knowledge and to show the teacher the learning outcome in the field of Sound, Light, Magnetism, Electricity and Chemistry. The teacher said to the students, “Please, show me something essential about sound or lights, and create a new experiment”.

While some students gathered and built groups and started the work, one group of 2 students was not sure how to start. The teacher created a new assignment for their personal needs. This group got the assignment to create a joint mindmap using the app Popplet. They collected their diverse knowledge they already have in one mindmap to identify where their personal gap is. That gap served then as the starting point to plan the experiment. Other groups started with the experiment without making such a mindmap. At one experiment, there were up to 7 students working three pupils made. The students got the assignment to document their process of planning and conduction the experiment. They shared the results in Dropbox and got feedback by the peers. In this example, the role of the iPad differs. It is a tool for documenting the process. The students used the Camera and Video recording features. They took photos and made podcasts. They podcast the preparation of the experiment in case the

experiment would fail to show the teacher what they have done so far and to analyze why it failed. The iPad was also used as a tool for resources to gain information (via Google/Bing, Youtube etc.), the students used the Textbook app (an app that have a lot of textbooks) and to share the documentation (Dropbox app). The students also used the app ProTuner (a tuning app) for illustrating frequencies in sounds.

5 Discussion

Creativity is closely connected to the creation of something. As Gerhard Fischer (2009) said “You can’t be creative without creating something.” The DaVinci project illustrates what kind of rubrics need to be addressed to foster a creativity-friendly environment in the context of higher education. When creativity is missing, those 6 rubrics are helpful for instructors, teachers and designers to foster creativity in classes and to support students to be more creative in their work.

The Odder project in Denmark showed how simple it can be to foster creativity and to flourish a creative learning culture using iPads. The cases presented here represent active learning focused on action and a focus on students to produce something. The teachers’ designs for teaching and their designs for learning included active student participation, and student engagement by *doing* something. All the examples showed that creativity – to create something new – plays a central role. The students produced something and while doing so, they reflected and learned. Just to mention that there is a positive relationship between being active and a deeper learning outcome (Chapman, 2003).

The didactical designs by the teachers were process-oriented rather than product-oriented. The teachers did not only focus on outcomes or exams/test only and did not expect students to reproduce the facts. The teachers had a learner-centered approach – they allowed their students to learn by making mistakes, they wanted to challenge their students, and yet, they scaffolded the learning process by providing feedback and personalizing the learning experience for students who struggled. In the three examples the iPad served as a “booster” to foster learning as a *process*. According to this study, the digital didactical design perspective reflects the following:

- Adopting the iPad, the design for learning is shifting to a ‘focus on action’ where the social relations among the peers as well as the teacher-student relation is integrated in the designs for a situation that is unknown.

While the small sample limits the generalizability of our findings, the data provides useful insight into the ways in which iPads can be used for learner-centered, creative learning in a classroom using mobile devices. When we began this research we raised the question if the iPad serves as a textbook substitute. The examples showed that that was not the case. Instead, the teachers created new didactical approaches where they transformed their traditional classrooms into a creative learning experience for their students.

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