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# Teachers of the Future in Digital Learning Environments

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## Abstract

The iPad-education, or tablet education generally, is perhaps the most talked-about phenomenon in education at the moment. However, there are still only a few concrete researches on how the iPad is used in pre-service teacher training generally to re-new learning processes and environments in primary school environments. This article focuses on pre-service teachers' manners of approach to use iPads in the beginning of Primary School Teacher studies in January 2015 in Adult Teacher Education in Kokkola University Consortium Chydenius. The first inquiry of the research project was carried out in January 2014 when the students had just received their personal iPads for their use. This article presents the results from the inquiry that was carried out in December 2015. The study results

will indicate the starting level of students as both producers and consumers of information, from the point of view of iPad users. The project contains a three-stage research process, which monitors how the use of tablet computers in the contextual-pedagogical learning environments supports teaching and learning in the context of producing and consuming of technology.

**Keywords:** I21 Analysis of Education, I31 General Welfare; Basic Needs; Quality of Life, I00 General

## 1. Introduction

The Finnish education system offers every child an equal opportunity for education. Basic education is completely free of charge, including the teaching, all the school materials and special needs education as well as health care and healthy school meals. According to the Basic Education Act (1998), basic education lasts nine years and caters for all children between 7 and 16 years of age.

A class teacher teaches children in the comprehensive school for the first six years, often teaching nearly all the subjects of the class. During the last three years of the basic education the subject teachers who have specialized in 1-2 subjects act as the teachers. The studies in the teacher education were moved to university in 1971 in Finland for the first time. The teachers' level of education is high and the teacher's profession is desirable (Sahlberg 2015, 136-147).

All the teachers of the comprehensive school take a master's degree consisting of 300 European Credit Transfer and Accumulation System (ECTS credits). It takes 4-5 years. Schools are not allowed to select their students – this is what we call the territorial or neighboring school principle i.e. every child can go to the school of his or her own school district. The Finnish educational system has also been celebrated elsewhere: for example, in 2010, Newsweek declared Finland to be the best country to live in in the world. One of the key components of a good life, according to Newsweek, is education. In Finland education was ranked as the best in the world in this universal comparison (Väljärvi & Heikkinen 2012, 31.)

This research project, with the objective to examine and to develop the tablet pedagogics as a part of teacher training, begun in January 2014. The students (N=38) who began their teacher studies in January 2014 at the beginning of the project as well as university teachers received personal iPads as the tools for teaching and learning. The personal iPads were acquired for the administration staff in March 2014.

A conception of the dimensions of the teacher's professionalism of the 2000s (21st Century Civil Skills Pedagogical Content Knowledge) serves as a theoretical frame of reference. This conception emphasizes the expression of transformational pedagogics in teaching and learning as well as the widening of teachers content and pedagogical knowledge to be the developers of the pedagogical-technological learning environments of the 2000s (Meriläinen & Piispanen, 2015.)

In the research project the teaching use of tablet computers is examined from the points of view of consumer – producer of the information (media producing - media consuming). With the diversification of the information technology equipment and the increase in the user experiences and use of the social media, the content production of the media has become a part of everyday life. The content is produced together and alone and the interfaces of producing and consuming of the content cannot be entirely distinguished from one another because the same person can simultaneously be in the role of both producer and consumer. The development of multi-literacy is one of the central skills that the modern teacher has to have command of. For this reason the focus of the project is developing the tablet pedagogics from the point of view of the student as an active producer of media (Meriläinen, Valli & Piispanen,

2014).

The project contains a three-stage research process that monitors how the use of tablet computers in the contextual-pedagogical learning environments supports teaching and learning in the context of producing and consuming of technology. The first inquiry of the research project was carried out in January 2014 when the students had just received the personal iPads for their use. (See Meriläinen, Valli & Piispanen 2014.) This article presents the results from the inquiry that was carried out in December 2015.

The average age of the teacher students in this study is 39,95 years. Nearly half of the students (42%) represent an age group of 25-35 years, which Prensky (2001) states to be the first generations to grow up with the new technology. The assumption, as Valtonen, Mäkitalo-Siegl, Kontkanen, Pönttinen and Vartiainen (2012) highlight, is that these students have automatically gained the skills to use ICT as they have grown up in the information society. More than half of the students are over 35 years of age, 42,8 % with the age of 45-57 years. These students were not born into the digital world but have, at some later point in their lives, become fascinated by it and adopted many or most aspects of the new technology. Prensky (2001) has named this age group as Digital Immigrants. Oblinger and Oblinger (2005) remind us, that although these trends are described in generational terms, age may be less important than exposure to technology.

The questionnaire was divided into two different categories: consuming information and producing information according to the use of iPad in learning and studying. The first measurement was carried out in January 2014, in the beginning of the studies. Each student had his own iPad from the university, so the measurement was to give information on the use of the iPad in studies as well as generally in personal use. The second measurement was carried out in December 2014, after 11 months of regular iPad use in the university studies.

Consuming information in iPad use was defined in the questioner as the ability to:

- access media
- watch and listen to music and podcasts
- use e-mail as communication
- play games
- take notes
- add bookmarks
- share and download information

Producing information in iPad use has been defined as the ability to utilize technology to create media, to participate in media environments and to create content to broaden creativity (Lim & Nekmat 2008). iPads with camera and video capability as well as an evolving and prolific store of apps encourage teachers to promote iPad use for the production of information in the

classroom too.

Producing information in iPad use was defined as the ability to:

- create media content
- collaborate in social media
- participate in media rich environments
- widen learning environments to virtual environments
- create virtual learning materials

As a production tool – for generating rather than just consuming information, the iPad has plenty of potential as Doherty (2010) represents. One such benefit is, according to Andrews (2013) that many of the iPad apps either integrate with one another or can easily be used together. This makes it an excellent platform for extending the scope of projects and for teaching learners how to find and combine the best tools for a task.

According to Sahlberg (2011), one key factor in the success of Finnish education and schools is the fact that pre-service teachers are encouraged to work collaboratively with the pupils as from the very begin of teacher studies. This requires innovative and creative teaching methods and skilful pedagogical planning, which are highly supported during their pedagogical practicums. (Sahlberg 2011, 2; Sahlberg 2015, 135-182).

The teacher education model used in Finland is admired by other teacher education programs and seen by some as a model to be emulated.”There is huge interest in it around the world, both in educationally well-advanced countries and also in developing countries. The significant problem in many countries is the fact that the teacher's profession attracts neither young people nor particularly gifted students, unlike in Finland (Meriläinen & Valli 2010).

## **2. Technological skills**

The iPad platform represents the same kind of technology that characterizes most of the mobile platforms today. According to the Mobile Life 2013 research, up to 61% of Finnish 16-60 years old inhabitants own a smart phone and 16% own a tablet so we can assume that new iPad users are to some extent familiar with how to use this new technology. As Valstad and Rydland(2010) state, the educational sector has laid their eyes on iPad and other tablets and experimented with these with educational purposes in mind. According to him, the iPad will offer an interesting alternative to textbooks and other ways of learning and interacting with each other in a new way that challenges the old, traditional way of learning. However, there exists very little concrete research on how the iPad is used in the classroom –the discussion is mostly focused on different apps, not on the pedagogical issues that should be crucial when developing new kind of learning environments. The adoption of new technology adds a new element to consider in the learning processes. To create effective, enthusiastic learning and teaching requires a comprehension of the processes of how students learn and interact with technology. Therefore teacher education has to provide tools for peer-service teachers to acquire an understanding of

the pedagogy needed in 21st century learning environments. As Valstad and Rydland (2010) state, the educational aim is just not to make the information accessible to students, but to make the learning accessible.

In Finland the level of information technology resourcing of schools is high but it is important to teach the children to use information technology and the social learning environments safely and diversely. Utilizing information technology and digital learning environments in teaching varies depending on the implementing sector and also the individual teacher, as often there are big differences in the skills and views of the teachers. The director of the Finnish National Board of Education, Aulis Pitkälä (2013) has stated that it is difficult to force teachers in new directions such as using information and communication technology. In his 2013 speech he referred to the comparative study by the EU commission which clarified the teaching use of information and communication technology. According to this study, there are relatively good communication networks and several presentation boards, learning platforms and data projectors in Finnish schools in comparison to the levels in the EU, but in the number of the devices which most affect the pupils' working possibilities, (the fixed workstations, portable computers and tablets) Finland is barely at an average level and this study showed that use of these devices was lowest in Finland in comparison among the other EU countries in the study.

In utilizing information and communication technology in teaching we have distinctly fallen behind other countries. Finnish schools are among the last ones in the levels of using the devices when the pupils themselves are asked about it. Also the number of comprehensive school pupils in Finland who during the last year have not been able to use a computer at all in school is the largest in Europe (31%). So there are devices but most teachers do not really use them, even in spite of the fact that it is stated that the teaching use of ICT is a part of the wider development of the information society which opens new opportunities for forming social contacts, networking, sharing information, official transactions, social participation and for other life areas, towards which the school should encourage its pupils. The low use of technical devices to support teaching – especially to support the personalized learning of pupils – speaks its own language about the uncertainty in using such devices. The majority of the teachers who use technology to support learning use equipment for presenting content (consuming media), of which the high number of the technical devices for presentation in our schools (the data projectors, presentation boards and learning platforms) is telling. However, the use of the technology amongst the pupils is still quite low, in which case, the pupils' own activity and the individual ways to work creatively and solving problems remains (Finnish National Board of Education, 2013).

In the new core curriculum to be implemented in 2016 (Finnish National Board of Education, 2014), information and communication technological competence is included as one of the seven areas of transversal (generic) competences. In it, the point of view of information and communication technology in teaching is considered as a part of the operational culture of the school, the description of the learning environments and approaches, in the definition of teaching which utilizes connections for distance learning and as an important tool in the home school cooperation:

“Information and communication technological competence: the information and communication technology is utilized diversely in different subjects and in other schoolwork and communal learning is reinforced. At the same time, possibilities to explore, to experiment and use the approaches and tools best suited for own learning and working are created for the pupils. At school, the effect of information and communication technology on the everyday life is studied and its sustainable uses are investigated.” (Finnish National Board of Education 2014, 157)

In Kokkola University Consortium Adult Teacher Training, from the beginning of 2014, there has been a strong focus on developing the students' skills in utilizing digital learning environments. So the students are given iPads for their personal use when their studies begin. They are used particularly in connection with the subjects and themes in the comprehensive school - study modules, so that the transfer effect on the class teacher's work would be as visible as possible. This article examines how the class teacher students have internalized and have command of the tablet devices as a part of the pedagogy, their own study and operation, and how they can utilize the tablet pedagogics in the teaching practice with the pupils of the comprehensive school from the producer-consumer points of view. The objective is to encourage the students to move from the point of view of the consumer of the technology towards the point of view of the producer.

### **3. Method of measuring and the material**

The research results of this study are based on the longitudinal study for which the data has been collected with the help of the questionnaire. In it, pre-service teachers (N40) were asked about their iPad use on two different occasions. The first time was at the beginning of the studies during a study counselling session where they filled in the form all at the same time. The second inquiry was carried out after ten months in the same way and in the same form. After the first questionnaire, the students received their personal iPad Air devices that were immediately brought into use as one of the study tools and as a learning environment. In this study the objective is to describe how its use transfers to teaching during the practicums.

The questionnaire was created on the basis of the Likert-scale. The Likert – scale is a method of measurement developed in 1932 by Rensis Likert and it is used in measuring opinions, among others. One of the most used choices of the answer alternatives was chosen, in which the choice of answers includes 5 steps: 1=never 2=seldom, 3=sometimes, 4=fairly often and 5=often. These alternatives were contextually best suited to this case. (See Valli, 2015). In addition to the Likert –scale questions, the students were allowed to answer the open question where they were asked how they have utilized the tablet in the teaching practice. These direct quotations have been included in the text of this study.

### **4. Results**

When examined from the consumer point of view, changes have happened in the use of the iPad in all of the examined areas as seen in Figure 1. In many cases the changes have been significant. Using the tablet has become a part of everyday life. In the latter measurements everyone reaches at least level three in all the areas, in other words the students utilize all the



ways presented in the figure fairly often. Looking for information and using e-mail are the most common, their averages rise already almost to five. The changes as a whole have been rather major.

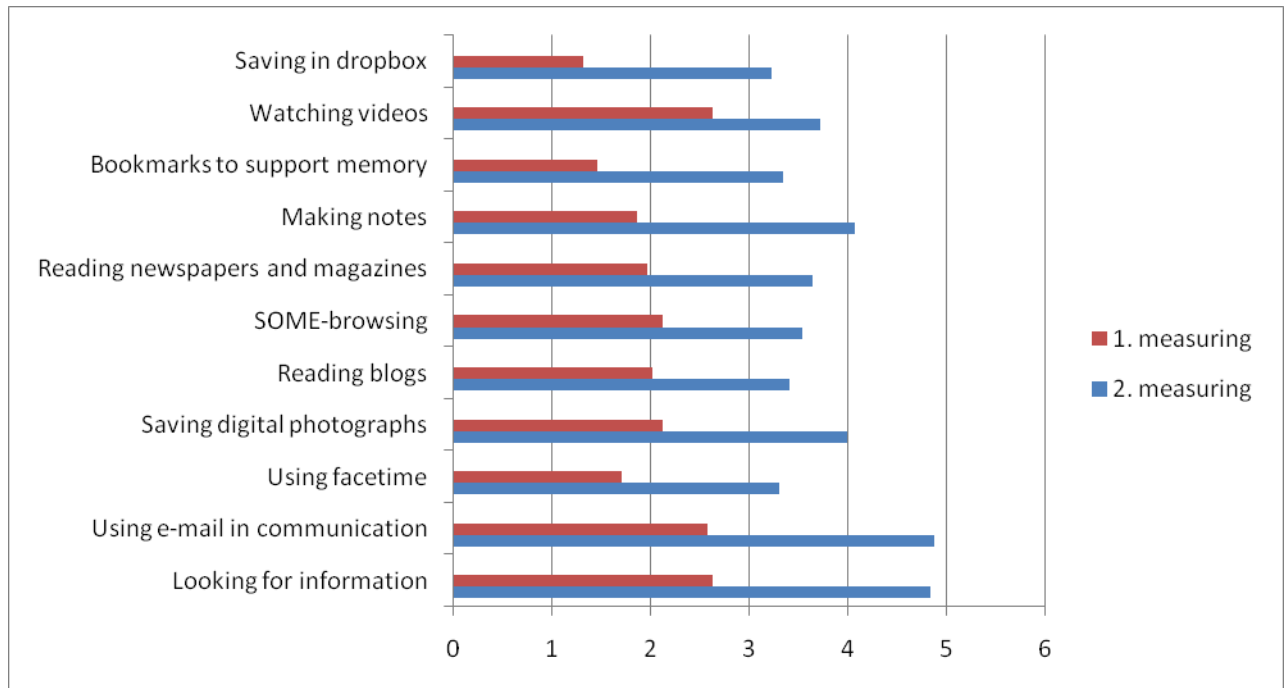


Figure 1. The change in the use of the iPad during ten months

This pre-and post-study showed a significant change in technology use over the course of the At the time of the second measurements the students utilize these skills already often or fairly often. These teacher students indeed are the experts of the future. Them using the tablet is natural and they are able to utilize it in many ways. The level of their competence is so high that they can offer the pupils meaningful learning experiences where the pupils utilize information and communication technology pedagogically.

“Using an iPad was totally new to me at first. Now I can adapt using the iPad in many different ways. However, my purpose is not to proceed in the pedagogics with the iPad in the lead but the curriculum in the lead. The iPad is a good tool in the teaching.”

In the comparison between the measuring times the use of the e-mail as a message tool (2,34), making notes (2,23) and looking for information (2,11) have increased the most. These are often in particular the areas through which the activity in the use of the social media is begun and from where the switch is then made to the control of still more difficult and more challenging matters. But as it can be perceived from the figure, in the latter measurements they are at so high a level that it is natural to expect that the activity is going to continue to increase further also in other areas.

Listening to books (1,69) and playing games (2,50) were the lowest. However, at the latter

activity, the threshold of seldom use was crossed on average and is approaching the activity that takes place sometimes. The following quotations represent well the situation described above and in connection with the teaching practice.

“I document the pupils' work a lot, I also use the iPad for planning the lessons and especially for giving the pupils' instructions. In the module we practised a lot in using sites to look for information.”

“I often make presentations/introductions etc. with the Pic Collage platform, among others, during the teaching practice. Key Note, I Movie etc. have become familiar after ”the starting difficulties”. Together with the document camera it is a really useful everyday tool.”

In these student quotations it can be clearly seen, how iPad use has expanded more and more from the use of ready material towards the production of media and the making of own material.

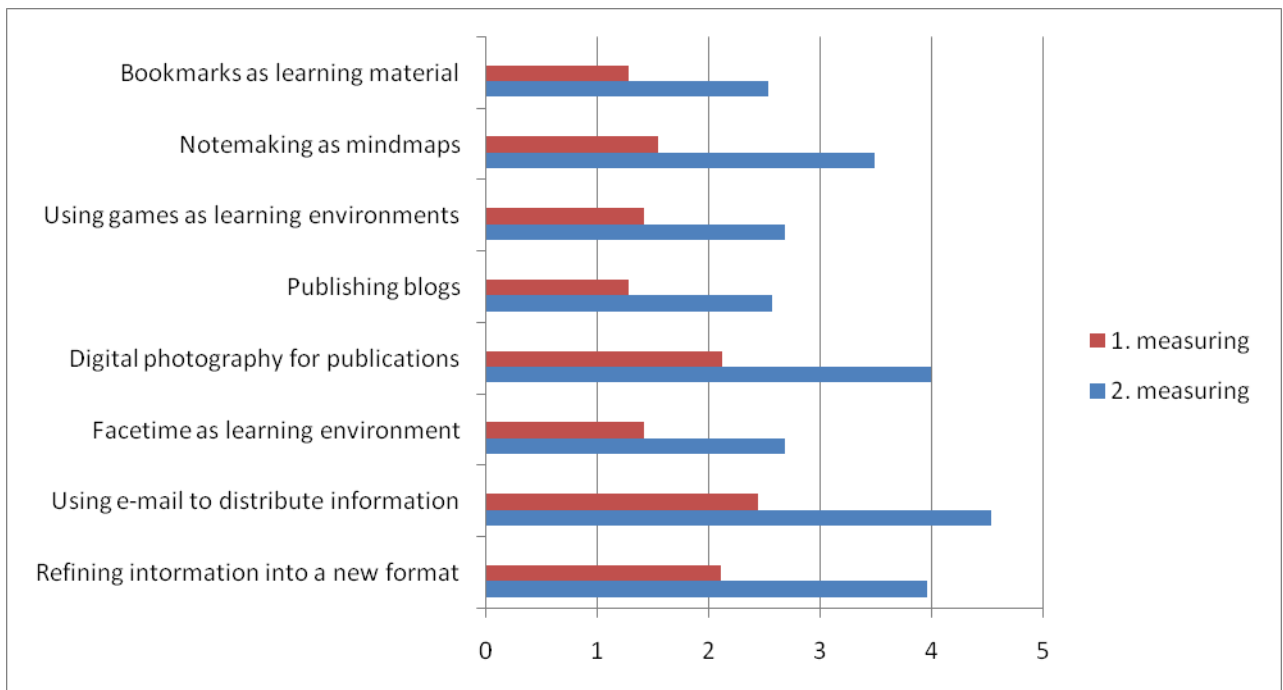


Figure 2. Change in the use of the iPad as a tool for producing during ten months

When the studies began, the students were more passive users (consumer) of the iPad. They had not really utilized its possibilities as producers of media themselves but had used the device mainly by using the ready material in it or the existing information, which could be reached with its help. In the first measurements the averages stay almost without exception under two, in other words on average even the ”seldom” – level was not reached. This was in spite of the fact that every teacher student already has work experience of the teacher's work before the beginning of studies (3,7 years on average) for months and several of the students even for years.

So one can state that even though the Finnish schools are equipped extremely well for

information and communication technology, it seems, however, that the use of tablet computers in the schools was still minor during the time of study. The change during ten months from the consumer of media to the producer of media has according to the presented figure (figure 2) been significant. The media skills of the students have developed alongside the pedagogical skills, which is also seen as a significant diversification of the use of the iPad. Alongside consumer skills, the skills of producing media have also developed, which means that the services and applications of information and communication technology are not only utilized but new material is also produced with their help.

The biggest change has taken place in the use of e-mail as a tool for distribution (2,11), in utilizing digital photography for publications (1,92) and in utilizing notes as a mind map (1,92).

Change has been the smallest in the following areas: production of electronic books (1,12), publishing blogs (2,58) and using games as learning environments (2,69). In case of the two areas mentioned last, clear development has however taken place between the times of measuring, in the direction of consumer action. The production of electronic books remained at the same low level. So interest was not yet taken in the reading of electronic books or in producing their own books very often during the time of study. This continues to tell about the ratio of power between a traditional book and an electronic book. Is there still too little electronic material so that they could even be read?

The objective and situation in which the students are at the moment in utilizing the iPad is represented in brief by this following quotation:

“I used the iPad to support learning in the practice. I will also adapt it to different purposes in the future. Not for the use of the iPad, but to support learning, the objectives come first. The iPad applies well to learning by doing. Not just using the iPad, but the approaches must be versatively supporting each other. I try the possibilities of using the iPad teaching diversely and bravely.”

The Finnish curriculum reform for Basic Education (2014) emphasizes developing the organizational culture and pedagogics by encouraging teachers to allow questioning, to make it possible for pupils to work together and to give room for critical thinking. These 21st century civil skills will grow and develop in learning environments that enable students to adapt their existing skills and knowledge to accomplish school tasks in formal as well as in informal learning situations. In today's new media landscape, consuming media content in traditional ways – e.g. when educators replace existing resources with new digital resources without paying attention to pedagogical changes, will not support 21st century civil skills to develop in basic education. This is why we have put more emphasis on producing media when supporting the development of the teacher students' knowledge of 21st century civil skills.

According to a recent study of Pew Internet & American Life project (2013) more than one half of teens have created media content and roughly one third of teens who used the internet have shared content they have produced. These youths create and use digital spaces for social interaction, identity expression, and media production and consumption (see Kupiainen, 2013, Mesch, 2009). Various terms have been used to describe this generation of youth including the

net generation, the millennium generation and digital natives. This group of young people grew up during the expansion of the internet, and from the early childhood have been immersed in the media-rich environment; using computers, playing on-line, communicating and connecting with their friends by electronic devices. It is obvious that our traditional teacher and text book centered learning environments require changes as well as new thinking and innovation. The intelligent, pedagogically meaningful use of technology, in combination with new and emerging evidence-based models of innovative teaching and learning, will, according to Meriläinen & Piispanen (2013), increase students' school motivation as well as the learning results. As a result, traditional teaching and learning methods and environments are becoming less effective in engaging students and motivating them to study and learn.

These teacher students continue their journey and keep on learning – they still have a year left of their studies. At the moment their skills in using their own tablets has been significantly diversified. It is a precondition also for making the versatile utilization of tablets in teaching in pedagogically meaningful ways a part of today's learning environments and making possible the development of the pupils' wide competence during the basic education. Information and communication technology allows room for different ways to learn – it serves both the pupils who are gifted users of the technology and those who need individual support. From the producer point of view of the technology, the curriculum's (the Finnish National Board of Education 2014) four main areas of the wide competence in the information and communication technology are best combined: (1) Practical skills and own production, (2) responsible and safe operation, (3) information management as well as examining and creative working and (4) interaction and networking (the Finnish National Board of Education 2014, 157). By paying attention to these views, the children can become the multi-talented experts of the future.

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