Mobile Device Supported Information Searching and Management in Vocational Education

The aspects of Communication, Collaboration and Learning

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Abstract: The purpose of this thesis is to outline experiences of mobile devices’ suitability to using them in teaching from teacher’s perspective inside Finnish vocational schools; how to benefit devices better in learning process, communication, collaboration, information searching and sharing between teacher, student, stakeholders and outer world. Mobile learning as an extension and possibility to more regenerative learning, effective communication and information management tool is viewed from working life demands in the 21st century. The core my study consists of information and communications technology (ICT) literacy skill, which is the ability to use technology to develop 21st century content knowledge and skills, in the context of learning core subjects and further in the working life.
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“Our greatest fear is not that we are inadequate. Our greatest fear is that we are powerful beyond measure. It is our light, not our darkness that most frightens us. We ask ourselves: who am I to be brilliant, gorgeous, talented and fabulous? Actually, who are you not to be..? It’s not just in some of us; it’s in everyone. And as we let our light shine we unconsciously give permission to other people to do the same. As we are liberated from our own fear, our presence automatically liberates others.”

Marianne Williamson: Our greatest fear from her book “A return to love” read by Nelson Mandela 1994 in his inaugural speech.
1. Introduction

According to the latest research made by Opetushallitus (Finnish Board of Education) the forms of education and the adoption of information and technology (ICT) solutions to teaching do not fully support the development of thinking and working skills that are needed outside school, in further education and in the working life. Teaching focus is still on knowledge instead of skills and instead of co-operation in individual's performance and evaluation (Opetushallitus, 2005). The study is inspired by the Finnish national educational policy, which aim is to promote the implementation of ICT in pedagogical practices at all institutional levels.

The overall theme of this study is to outline experiences and outcomes of mobile devices utilization from teachers perspective in Finnish vocational schools; how to benefit mobile devices as an extension to ICT in learning, communication, collaboration, information searching and sharing between teacher, student, stakeholders and outer world. I have also scoped information and communication management in mobile learning and what kind of pedagogy mobile devices utilization in the studied context could promote. When I speak of ICT, I handle it in its broadened, modern context, covering handheld wireless technologies as mobile devices. This broadened meaning connotes that the enriched learning, collaboration and information management is the main outcome of their use. The portability of devices coupled with wireless connectivity is identified by Barker, Krull & Mallinson (2005) as offering remarkable benefits to learners in term of flexible access to learning materials. The integration of social software (web2.0) (Kolbitsch & Maurer, 2006; Cress & Kimmerle, 2007) and new mobile technologies (Kurti, Milrad & Spikol, 2007) has opened new dimensions to learning to be extended to various environments and situations. The changes in technology and information explosion (ICTs Guo & Kraines, 2009; Wilson, 2010) including various solutions and applications, enables better knowledge management and information sharing between different parts (Evans & Dansereau, 1991; Bradshaw et al., 1998; Merlyn & Välikangas, 1998; Binney, 2001).

A survey made by DG education and culture (2005) shows that Finland has a high degree of e-readiness compared to other EU Member States, and as a society owns a high technology penetration; many institutions are working with innovative ways of using new technology (p.19). Despite this, mobile devices are still used and studied more in high schools and primary schools than in vocational schools not only in Finland, but in many other countries too, as ICTs use in education still has quite young history (DG education and culture, 2005).

Although there have been a number of development projects, experiments and pilot studies on using ICT in school, the studies about long term and deep-going affects of ICT are still few (Kozma, 2003a; Venetzky & Davies, 2001). The ways how ICTs and new digital media shape conditions for communication and information management in learning cannot be neglected; about 20 years’ experience in classroom and school practices, as well as research evidence points that ICTs use in education affects somehow to ways how learning takes place (e.g. Bayraktar, 2000–2001; Korte & Hüsing, 2007; Kozma, 2003a).
1.1 Problem definition

The problem definition focuses to find out how mobile devices could serve as an “information agent” and a learning tool in information management and how to acquire knowledge in vocational level in Finland. All the changes, possibilities and new demands in 21st century of social media and ICTs are urging to identify practices to use mobile devices among Finnish vocational teachers to ease information searching, communication, collaboration and learning process between teacher, student and outer world. Although Finland is perceived to be a high technology country (ibid), I look reasons why there still is the distinctive hindrance to utilize new ICTs as an effective information management tool among teachers. My problem definition scopes Finnish vocational teachers’ practices and experiences to implement the ICTs in their teaching to facilitate learning and in what extent teachers promote the working life demands related to 21st century in their teaching. The intention is also to evaluate the outcome of ICTs utilization and devices cognitive and social interaction perspectives to communication, collaboration and learning through received feedback.

1.2 Goal and research questions

The goal of this thesis is to reach views of Finnish vocational teacher’s opinions of learning along expansion of ICTs and gain insights how ICTs/mobile devices use relates to needs to manage information, communication and collaboration better. My aim has also been to emphasize the conceptions of learning styles which promote mobile learning in vocational education context; how the devices have been used and what is the outcome of their use in the courses. What has changed along devices use and how do the teachers see the change? The focus, although will be more on ICTs/mobile device supported communication and information management, than in pedagogical approach to learning.

The research scopes answer of the demanded working life skills in 21st century; how do the Finnish vocational teachers see the relevance of those skills to teaching and as an advantage further to the students in their later professional career?

This essay does not purport to provide some groundbreaking discoveries since there is not much experience in practice of the use of mobile device on a large scale in vocational education in Finland. As technologies become more affordable, more prevalent and more useful in the everyday life, it’s vital to adopt and utilize mobile devices possibilities in vocational education by throwing light on new dimensions in communication, collaboration, information sharing and -searching in learning processes.

- What are the opinions of Finnish vocational teachers about the possibilities provided by mobile devices in teaching?
- What are the experiences of the Finnish vocational teachers of the changes introduced by mobile devices in their courses?

Other questions are not highlighted from surveys perspective in questionnaire but rather as supporting information to my study.
1.3 Delimitations

There is a body of literature within the research concerning technology supported learning and communication (in which mobile devices are included). I have limited myself to the research that I have found dominant regarding to ICT/mobile device supported information searching and management as well from collaboration and communication perspective in this area. The focus is not to study appropriate applications or content of teaching material but to investigate on research of use, cases and experiences of mobile devices use in teaching, communication and information management from Finnish vocational teacher’s perspective. Mobile tablets burst into the market with the release of the first Apple iPad in March 2010, so the research of the use and an experience at this point is quite narrow. My first intention was to study iPads, but because this young background I focused the subject into different mobile devices. The study is limited to the Finnish context and the core of my thesis is to see ICTs utilization by using mobile devices in general as a part of information management and learning inside Finnish vocational schools. The group of respondents is limited and self-selected. I have not districted the studied subject into certain discipline or course but on the contrary tried to catch cases and experiences of use largely from Finnish vocational teachers’ perspective.

2 Previous research and literature review

An extensive study ordered by European Commission explored the use of information technology in schools in Europe (Board of Education, 2013). The Survey was commissioned in 2011 by the European Commission (Directorate General Communications Networks, Content and Technology) to benchmark access, use and attitudes to information and communication technology (ICT) in schools in 31 countries (EU27, Croatia, Iceland, Norway and Turkey). The pilot study examined the use of tablet devices to enhance teaching and learning practice. The Survey was conducted in partnership between European Schoolnet and the University of Liège (Service d’Approches Quantitatives des faits éducatifs, Department of Education). According to this study finding, teachers consider in general that they are more confident in their operational skills than in their use of social media, which is one operative elements of mobile devices utilization in teaching. ICT was mainly used to prepare lessons, not during lessons although teachers have been familiar with ICT for some years. Findings in this research show that teacher are positive about the impact of ICT on students’ learning, and organize more often ICT based activities than previously. Students’ interest to use ICTs in their spare time indicates their positive attitude towards spontaneous self-directed learning. Surprisingly, around 70% of students at all grades are taught by teachers who have engaged in personal learning about ICT in their own time. Although online resources and networks are largely available in Europe, they are a quite new way for teachers to engage in professional development, and only a small number of these facilities are used by schools. (European Commission, 2013).

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1 European Schoolnet is a network of 30 Ministries of Education in Europe concerned with the transformation of teaching and learning processes all over Europe and more specifically with the use of ICT and digital media in that context. This year's event "Teacher Training for the 21st Century" took place on 4-5 December 2013 in Helsinki, Finland. Networking is an annual event organized by European Schoolnet.
An online survey conducted as part of the 2011 MMB study, a survey of 76 experts from Germany, Austria and Switzerland shows that leading market research and consultancy firms see great development and growth potential, particularly in mobile and cooperative learning over the next few years. De Witt (2013) names mobile learning and social learning as key examples of the new learning trends; the relevance to initial and continuing vocational education and training. It has been noted that major amount of the potential for success in using new technology is dependent on the instructor and the literature refer that instructor support is vital. A study on the perceptions of students and teachers on the adoption of new technology found that supporting teachers in integrating technology into teaching promotes beneficial pedagogical outcomes (de Winter et al., 2010).

The first study phase results published in December 2010 by the International ITL (Innovative Teaching and Learning) and the first results by OPTEK are parallel. Both studies clearly state that there is an increased need for innovative learning practices in Finland, so that pupil learn a new era civic skills already at school. OPTEK-project was based on parallel project to the development project to national Information and Communication Technology in everyday school life. In December 2010 ended development project was coordinated by the Ministry of Transport and Communications, and it was carried out together with Ministry of Education and the National Board of Education. The project defined information about operative models to consolidate the use of communications technology in teaching and there was prepared a national plan for using ICT in teaching. The project used pre-existing national and international research results as well as the challenges set out in the school development (Kankaanranta, 2011).

Studies indicate quite uniformly that ICT increases learning motivation and commitment to learning (ibid), although schools have remained resistant to the adoption of the devices despite quick growth and use of mobile devices (DG education and culture, 2005; Kozma, 2005). As advantages to educational use of ICTs there have been mentioned increased collaborative working, active and qualitatively high-level interaction processes, a deeper commitment to learning and the concentration to subject being studied, as well efficiency on focusing on conceptual learning (Board of Education, 2010). Messinger (2011) conducted a study of the perceptions and attitudes of high school students versus teachers regarding the use of mobile devices to support or encourage learning inside and/or outside the traditional classroom. His finding was that “the student and teachers at the subject high schools are ready to adopt mobile learning”, but teachers feel they need for additional support and training to demonstrate appropriate knowledge and expertise to use convincingly the devices with students. Because this, teachers have remained reluctant to accept the devices as learning tools. According to his study, “teachers and students had the same opinion about the potential for mobile devices to inspire the creativity of learners, create a more positive classroom learning environment, and increase student motivation”; yet students will need to understand proper mobile device etiquette in school, and teachers will need further training to manage effectively a mobile learning environment (p.137).

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2 MMB-Institute for Media and Competence Research supplies actual and reliable data, derived from studies which use innovative methods to identify current subjects and trends. The well-founded results of the MMB studies provide the basis for sustainable recommendations for decision-makers in politics, economy and education. Clients of the independent, private research and consulting institute are federal ministry, public institutions and associations as well as private business enterprises et al.
Despite advantages above, most of the research studies on collaborative learning have been done at the primary and secondary levels. As yet, there is little empirical evidence on its effectiveness at the college level (Anuradha et al. 1995). According to National Knowledge Society Strategy 2007-2015 (Prime Minister Office, 2006) the purpose is to use ICT as a part of blended learning at all levels of education, as well as to promote teachers information society excellence.

Recent developments in mobile technologies have contributed to the potential to support learners studying a variety of subjects (Board of Education, 2010; Scanlon, Jones & Waycott, 2005; Sharples, 2000) in elementary education (Zurita & Nussbaum, 2007) as well as in higher education (Baggetun & Wasson, 2006; Järvelä et al., 2007). Adoption of new means of communication and cultures during studies strengthens learners' success in the working life (Kalliala & Toikkanen, 2009, p. 10). According to Bloom's taxonomy (1956), remembering, understanding, applying and analyzing represent lower level competence. Our teaching culture is such that just these skills are emphasized most in our teaching. Creating and evaluating, in turn, are a higher level of expertise and in fact they also include all the levels below them. By Houghton (2009), rising up through the levels of personal growth and well-being requires growing knowledge at every level. Gaining access to communication systems and relevant information is critical at each point, especially information and communication options that expand the channels of information available.

Latest surveys (ITU, 2013) points out that the use of Internet via wireless networks and devices will continue to grow strongly, accompanied and/or driven by an ever-increasing supply of mobile applications and services in the markets (p.3). Virtual environments are also a growing extent (Green, 2013). Mobile devices can bring new dimensions to produce and share information to demonstrate competence. Written production is not the strength of all students and possibility to e.g., visual production of materials (Opetushallitus, 2010; Vähähyypää, 2011; Zywno& Waalen, 2002) can motivate students in a new way and it enables the flexibility for students to engage in the educational process and material anywhere, any time (Dew, 2010). “When there is no need to describe everything in a written form, and you have a voice, picture and video instead, we can better highlight issues such as work processes, and the key competencies for lifelong learning related to knowledge” (Vähähyypää in Kankaanranta, p.19).

2.1 The usage of ICTs in schools

The recent findings show that the usage of ICTs in Finnish schools is far behind from Europe. There can be noted differences in different schools and teachers’ competence and enthusiasm are relevant factors. This issue appeared recently after new Pisa -survey (Ilta-Sanomat 5.12.2013) was published and the results dropped Finland down from one of the leading countries in school performance. A Finnish Minister of Education, Krista Kiuru claims in the mentioned article that the lack of success is associated with incompetence of schools to take advantage of new ICT. An International Schools IT (information technology) study (Helsingin Sanomat 22.12.2013), reveals that Finnish schools and teachers are the lowest ICTs users in the EU. The article takes up the importance of teachers’ right attitude and skill improvement concerning the subject and indicates that ICTs should be blended in all teaching. It seems that when the ICT has
been integrated into a learning environment by pedagogically meaningful way, it engages students’ multiple learning styles (Naimie, Siraj, Ahmed Abuzaid, & Shagholi, 2010). However, we need more research on ICTs’ affects concerning different taught contents/disciplines in a longer term. Related research of student perceptions of learning with mobile devices and tablet computers require study in multiple courses and across multiple sections and disciplines for a broader sample (Enriquez, 2010; Yang & Lin, 2010).

2.2 Notions of disadvantages towards use of mobile devices in school

Several reports have been published on the benefits and potential of mobile learning and a number of researchers have found reasons to advise caution on its full adoption. There is a debate going on in Finland whether we should allow mobile devices as phones, tablets and smart boards use inside classroom, and there can be seen a clear allocation to those who do not accept them in school and to those who see mobile devices as a learning tools.

Beyond the problems of digital and technological divides, Guri-Rosenblit (2005) identifies a concern in the adoption of new technologies: “The problems and questions that the digital technologies assist in solving in teaching/learning practices are blurred and not clearly defined” (p. 18). Mobile learning activities can create a sense of isolation in non-technical students who are not familiar with technologies (Corbell & Valdes Corbell, p.54, 2007). According to Wang, Wiesemes & Gibbons (2012) failures and troubles of wireless Internet (Wi-Fi) connectivity cause frustration and disappointment among students and there have been noted problems with the size of mobile devices (p. 357-374).

2.3 Working life demands to vocational teaching in the 21st century

Many schools still use traditional behaviorist approach to teaching (ibid), where the learners’ role is to repeat and imitate the taught content. New digital technologies have created a whole new social innovations and practices, especially among young people. They are going to create new forms and applications to learning. They can also lead to radical new learning practices and to replace the present form of education shapes. Digital technologies also force to assess the key skills demanded today- identifying new areas of civic skills.

The Ministry of Education (1999; 2004) has promoted an extensive teacher in-service training, financing of the technological infrastructure (e.g. by giving local municipalities and schools funding for buying computers and other equipment and building network connections), and the creation of digital learning material (Ilomäki, 2008).

There is a profound need to rethink the significance and applicability of what is taught and to strike a far better balance between the conceptual and the practical; what are the core subjects and methods that foster required 21st century skills, which are needed in today’s working life. The challenges are not restricted only to environmental and substance level, although these are important to gain succeed result. As mentioned before, the analyzing gaze hits also to right attitude; flexibility, the desire and will to do things differently. Erstad (2007); Ilomäki & Lakkala (2007) conclude that the problems in handling the necessary change and the need to change the role of the teacher, concerning implementation of ICT, have affected negatively the atmosphere among teachers. There is an obvious need to focus on growing and applying essential 21st
century skills and knowledge to real problems and issues, not just learning textbook facts and formulas.

In the future, instead of school books, students’ social skills as well as the active editing of information and sharing are emerging as key areas of expertise. Similarly, cooperation with the surrounding community will be emphasized. Besides skills listed below (Opetushallitus, 2010; Dede, 2009), ICT literacy is described to core 21st Century Skills. The 21st century learning should not be controversial. It is simply an effort to define modern learning by using modern tools. Along the revolutionary explosion of ICT and its extension to social media, the skill demands are different compared e.g., to 1800 century, without ICT solutions. Today’s learning- and teaching styles differ from past centuries because of ICTs expansion to classrooms and further to networking with outer world. The demands in today’s working life are highly affected by the expansion of ICT to everyday life. My research looks the features of 21st century skills compared to skill demands in the past centuries; how the new ICT tools, manners and means, typical to our century affect to learning to be updated. Each century brings new and different skill demands, and they are relevant to how we obtain, use and handle information. The modern things in 2010 have accelerated far beyond 2000, a year which now seems “so last century”.

“Information and communications technology (ICT) literacy is the ability to use technology to develop 21st century content knowledge and skills, in the context of learning core subjects. Students must be able to use technology to learn content and skills — so that they know how to learn, think critically, solve problems, use information, communicate, innovate and collaborate (Dede, 2009, p.5).”

3 Definitions and terminology

3.1 Mobile device

A mobile device as mobile phones, smartphones, tablet PCs or hybrid netbook tablets, handheld tablet or other devices that are made for portability (with touch screens) are always ready for use and are lightweight, provided with relatively long battery discharge times. A wireless computing device that is small enough to be used while held in the hand is both compact and lightweight. Term hand-held includes a large selection of smartphones, PDAs (personal digital assistant) and other mobile devices. New data storage, processing and displaying technologies have allowed these small devices to do nearly anything that had previously been traditionally done with larger personal computers. Handheld device combines a tablet computer, camera, wireless and mobile phone connection and these functions remove the barriers to manage information better; learning can take place anywhere and at any time (Ericsson, 2014, Nokia, 2014).

Mobile device serves as an “information source” (e.g., navigation, access to knowledge databanks), as a communication tool (e.g. collaborative exchange with other learners) and as a cognitive medium (production and exchange of notes, photos, videos or mind maps, etc.)” e.g., on real-world excursions or within work processes (Tétard et al., 2008).

A mobile device is a tool that allows the learning processes construction closer to an authentic learning environment and situation.


3.1.1 Mobile device vs. traditional desktop

Mobile devices can support mobile computer-supported collaborative learning (MCSCL) by providing another means of coordination without attempting to replace any human-human interactions, as face-to-face discussions (Zurita et al 2003; Cortez et al 2004; Zurita and Nussbaum 2004). It is forecasted that by 2015 mobile tablets will overtake desktop usage (IDC, 2013) and 80% of all people gaining access the Internet will be using a mobile device (Ericsson, 2010). Consequently, mobile technology figures prominently in the future of higher education, particularly in its integration into teaching and learning. The growing use of mobile technology at colleges and universities is the most current trend forcing educators to evaluate the merits and limitations of a new technology (Rossing, Miller & al. 2012).

A recent study made by survey Monkey (Yarow, 2012) where people were asked about their top three activities they do on desktops or tablet devices, showed that tablet like the iPad is most useful for surfing the web, reading news, social networking and playing games (picture 1). Traditional computers were used as much as tablets in email use, but considered significantly better at banking, shopping, creating documents, and doing work related activities.

![Bar chart showing activities on computers vs. tablets](source: Survey Monkey, Oct. 2012)

Although desktop seems to have a well-founded place among used ICTs, the global, growing trend of people’s mobility (ibid) reflects on need to use portable devices, which are not tied to place or time. The feature of mobility in working and tools we use supports also the principles of 21st century skills and lifelong learning.
3.2 Information Management

“What you do not know has power over you; knowing it brings it under your control, and makes it subject to your choice. Ignorance makes real choice impossible “(Maslow, 1963, p. 116). Maslow’s words represent the universal legalism, that it’s question about the awareness; how we manage the information and channels available around us.

The management of information is one more of the many 21st century exponential trends. As a concept, information has several interesting characteristics that are transforming the 21st century. The explosion of information has also created a series of "information induced gaps that create serious challenges for society, educators and students in classrooms" (Houghton, 2011). Information management is the collection and management of information from one or more sources and the distribution of that information to one or more audiences. The focus of Information System is on managing and developing business processes using information systems, networks and applications. The aim is efficient management of information resources and the skilful implementation of information systems applying technology, which best supports the particular organization needs (van der Aalst, 2003).

Throughout the 1970s information was mainly limited to files, file maintenance, and the life cycle management of paper-based files, other media and records. With the proliferation of information technology starting in the 1970s, the job of information management took on a new light, and also began to include the field of data maintenance. By the late 1990s when information was regularly disseminated across computer networks and by other electronic means, network managers, in a sense, became information managers (Wikipedia).

According to Case (2007), the Internet could serve as a metaphor for information behavior and the way our view of it has changed. “All of the information was out there in individual offices, filing cabinets, minds, and computers, before the World Wide Web was available. But because it was divided by source, by location, by person, and by channel, it was not always easily located or examined.”

3.2.1 ICTs integration to Information Management

Mobile technology is used as a tool for evidence gathering, information management, as an aid to reflect on learning and experiences occurring in the workplace (meaning also schools). For example, “capturing moments in the classroom that would help with the writing up of an assignment later” (Stone in Pachler et al., 2011, p. 80). Advanced information technologies (e.g., the Internet, intranets, extranets, browsers, data warehouses, data mining techniques, and software agents) can be used to systematize, enhance, and expedite large-scale intra- and inter-firm knowledge management. (Alavi& Leidner, 2001, p.108). Mobile devices, among information products (Ip) are made visible, communicated, and exchanged only when people transform Ip into information, and put it into Ip. Without them, little business could be done inside organizations, or between them and the outside world. Organizations create them for making their knowledge visible, communicating knowledge and exchanging knowledge with all people they are in business to serve. In Ips the needed knowledge is transformed into accessible, usable and understandable form to all it should serve.(Liz Orna,2005).
According to Todorova (2007), it is impossible to neglect the impact of information and information technologies on the strategy of companies nowadays because of its important role in competition. ICTs provide continuous information flow, which the organization should use in forming its corporate strategy and accomplishing its management activities in decision making (Todorova, 2007). Dede (2007) states that many sectors of the economy are now in the process of developing and stimulating business strategies based on how people now use ICT as a mean of individual and collective expression, experience, and interpretation (p.6). As an ecological advantage could be noted that in 2000, 75% of the world's information was still in analog format (paper, videotape, etc.) but by 2007, 94% was preserved digitally (Hilbert & Lopez, 2011, in Houghton 2011). Knowledge has the unique capacity to greatly reduce society's vast inequities of power (force, influence and wealth) (Bodley, 2003; Toffler, 1990 in Houghton, 2011).

Amnesty highlighted in its annual report (2011) the importance of the role of social media in democracy development: information sharing and awareness of things give people possibility to affect their circumstances and lives (Stakston, 2011, p.23).

### 3.2.1.1 “Mobile Knowledge work”

Many authors have examined the relation between knowledge management and IT solutions [ex. Syed, 1998; Merlyn and Välikangas, 1998; Rao and Sprague, 1998; Junnarkar & Brown, 1997]. Researchers’ expectations for technology towards the beginning of the 1990s arose from the severe criticism by “constructivist” researchers against “school learning”; there was a gap between informal and formal learning (Resnick, 1987). Learning should take place through authentic activities and real life contexts, in which knowledge is used to solve ill-defined and complex problems (e.g., Bereiter & Scardamalia, 1993; Brown, Collins, & Duguid, 1989; Bruer, 1993; Resnick, 1987). Knowledge work involves solving problems “under ambiguous conditions.” As computers take over more routine work, the remaining problems are more ambiguous, and to solve them requires both individual knowledge and also the social and communications skills to draw on others’ expertise (Levy and Murnane, 2004).

“Technology solutions are one component of supporting work-based learning” (Gogging &Jahnke, 2013, p.2 ). Research has begun to prove, that ICTs supports creativity, critical thinking skills and problem-solving skills (Opetushallitus, 2010). Johnson & Johnson (1986), points that cooperative teams achieve at higher levels of thought and retain information longer than those who work quietly as individuals. The shared learning gives an opportunity to engage in discussion, take responsibility for own learning, and thus enable students to become critical thinkers (Totten, Sills, Digby & Russ, 1991).In common with e-learning³, mobile learning supports learning processes through information and communication technologies. Their independence from power sources and their permanent network connections make the devices immediately available when needed within the learning process or in the situational context (de Witt, 2013).

Mobile Learning means decentralization of information handling because learner can work with his or her mobile technologies anywhere and anytime (Tella, 2003). Today’s

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³ The official and very broad EU definition of e-learning: “The use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration.”
students are digitally literate (Oblinger, 2004) and the story of mobile learning is no longer a narrative about devices—iPods, phones, tablets, PDAs (personal digital assistants), or similar “always connected” wireless machines (Johnson, Smith, Willis, Levine, & Haywood, 2011). Naismith & al. (2004) conclude that learning activities incorporating mobile technology will move further out of the classroom and further into the learner’s physical and virtual environments, amplifying learning to be more situated, personal, collaborative and lifelong (Naismith, Lonsdale, Vavoula, & Sharples, 2004).

Due to more affordable technology and improving digital networks, many people turn to mobile devices as their first choice for connectivity (Johnson et al., 2011).

The quick dissemination of information technology largely in society has taken its place also in education. According to Hargreaves (2003) OECD has been one prime mover behind new knowledge economy initiatives. There can be noted significant investigation in ICT for educational use in all OECD countries (OECD, 2004).

### 3.2.1.2 Social media and communication in Information Management

Relative to new technologies, social learning means learning in social structures and networks via the Internet. The online components are complementary to traditional offline learning. Social media is based on Web 2.0 technologies and is composed e.g., of social networks on online platforms, social network for business and career, blogs, wikis, folksonomy and video sharing (de Witt, 2013). Users establish personal profiles on these social networks; contact others, form interest groups and share ideas and opinions. Created media content of all kinds can be posted on the Internet which makes it accessible worldwide. The most characteristic features of social media are participation and collaboration.

Social media (also referred as to Web 2.0) has changed and refined crucial the way we communicate. According to Falkheimer & Heide (2012) communication can have strategic approach to catch the needed goal. In this meaning it can be defined organizations conscious communication effort to achieve the wished result (p.12). The World Bank defines ICTs as the set of activities which facilitate by electronic means the processing, transmission and display of information (Rodriquez & Wilson, 2000).

Maggiani (2010) states that some universities have stopped distributing e-mail accounts and are distributing e-Readers, iPads and tablets instead. He presents communication as two-way and often multidimensional conversation, contribution which encourages interaction in both positive and negative dimensions, collaboration which promotes information exchange among participants and it enables networking as well quick access to information and people. It’s about community, shared attitudes, interests and goals through interaction (p.52-55). Mobile-device supported communication and information management helps to shape what learner finds useful and gives new dimension to message and learned content. Being able to communicate effectively is a matter of management and one of the most important of all life skills (e.g. Barker, 2006) and its meaning has been highlighted along the growing exploration (ibid) of new ICTs and social media.

In socio cultural view, learning takes place through communicative interaction between people, individuals, groups and artifacts, such as books, computers, index terms, search engines on the Web, etc. (Limberg et al., 2008).
Virtual environments operate on the continuous data selection and evaluation and with it the information analysis, which develops data acquisition and management skills continually. Students learn to analyze and integrate data entities in a different process compared to ready provided information from teacher's material or textbooks. The new digital learning environments and social media have a modifying affect to teaching and learning. Learning in a variety of virtual environments edit approach to knowledge building into more social direction. While studying in virtual environments and with help of social media learners build and produce information that is more complex than the studied content itself. Learning takes place in interaction that will force to ideas, reflection and exchange of views (Finnish Board of Education, 2010).

Social medias’ extension to ICT can give better opportunities to express tacit knowledge, which is hard to communicate but can be shared in discussions, storytelling, and personal interactions. Social networking offers new ways to think about how learning as a social activity may be influenced by new technologies for enabling social interaction. YouTube, is uniquely suited to capture and render more of the tacit dimension of knowledge. (Goggins & Jahnke, 2013).

4 Towards mobile learning

4.1 ICT supported learning

Naismith et al. (2004) names several activity-based approaches to learning that can be supported by mobile technologies. Alexandersson& Limberg (2010) findings show that information seeking via new technologies change conditions for students’ assumption of responsibility and also for the ways in which they construct knowledge (p.138). According to Tétard and Patokorpi (2005, p.169) following learning principles can be identified to activity-based approach to learning:

• a larger goal that organizes smaller tasks into a sensible whole
• ownership of the problem so that the learner will be motivated to try to solve it
• the problem is close to a real world problem
• many possible solutions to a problem
• the learner has the main responsibility for gathering knowledge
• the learning environment should be similar to a real-world environment
• building on the learner’s prior knowledge and experience
• room for alternative individual learning strategies
• opportunities for social interaction and cooperation
• communication with peers and outsiders encouraged
• iterative learning process
• guidance should be provided

Information can be obtained best through different types of interactions with the information or skill to be learned. Depending on the learning style, people motivate and get engaged differently. Learning style can be described as the way in which information is most easily absorbed, processed, applied, and retained by an individual. There are three basic types of learning styles: auditory, which includes listening and speaking; visual, which includes seeing and reading; and kinesthetic, which incorporates some aspect of “doing” in the teaching and learning process (Terrell, 2005,
Illeris, 2004, Ormrod, 2012). eLearning that is designed to incorporate optional activities for students to choose, based on their personal learning style, adds students’ motivation, engagement and learning success. Using mLearning as a mechanism for incorporating those optional activities also adds the flexibility and convenience valued by most learners. mLearning represents more autonomous and independent way to handle information. The portability and immediate communication properties of mobile devices influence the learning processes in interacting with peers, gaining access to resources, and transferring data (Chen, Chang, & Wang, 2006).

Chosen pedagogical approach integrated to ICTs in teaching has an influence on learner and also how the information is processed afterwards by learner (ibid). Reliable pedagogical methods and learning principles form the basis predicting human behavior and expected learning outcomes (Wankel et al., 2013).

4.1.1 Computer-supported collaborative learning

According to many authors, collaboration has become an important subject in the area of education (Johnson & Johnson, 2002; Roschelle and Teasley, 1995). It has been defined as an essential component of 21st century skills (Bruns, 2007), and thus its adaptation to the content of education is crucial. The basis of both collaborative and cooperative learning is constructivism: knowledge is constructed, and transformed by students. Learners do not passively receive knowledge from the teacher; teaching becomes a transaction between all the stakeholders in the learning process. Through online collaboration, students may come to see the importance of taking responsibility for their own learning and feel empowered to do so while learning to respect the opinions and work of their online partners (Dooly, 2008).

New technologies as wikis, podcasts, digital video PDAs, mobile devices and game consoles can support social construction of learning, assessment, motivation, differentiation, personalization and engagement in learning for students (de Winter et al., 2010; Enriquez, 2010). Constructive perception according to constructivist (e.g., Dewey, 1929, 1933/1998; Montessori, 1946; Kolb, 1976, 1984) is based on experimental learning through real life experience to construct and challenge knowledge. It is problem based, adaptive learning, that integrates new knowledge with existing knowledge, cast doubt on previous formula and allows for creation of original work or innovative procedures. The purpose in education is to become creative and innovative through analysis, conceptualizations, and synthesis of prior experience to create new knowledge. The learning goal is the highest order of learning: heuristic problem solving, metacognitive knowledge, creativity, and originality that may modify existing knowledge and allow for creation of new knowledge (in Lombardi, 2011, p. 41).

Computer-supported collaborative learning (CSCL) is a pedagogical approach where learning takes place via social interaction using a desktop or through the Internet. CSCL proposes the development of new software and applications that bring learners together and that can offer creative activities of intellectual exploration and social interaction. Students learn by expressing their questions, pursuing lines of inquiry together, teaching each other and seeing how others are learning. Stimulating and sustaining productive student interaction is difficult to achieve; it requires skillful planning, coordination and implementation of curriculum, pedagogy and technology. (Stahl, Koschmann, Suthers, 2006, p.2). There is a crucial importance for both: the computer-supported collaborative
learning community and the computer-supported collaborative work community to build a bridge between learning what is known and learning that creates new knowledge (Goggins & Jahnke, 2013, p.5). Students have expressed activities using tablet computers in class to foster productive collaborative learning and improve interactions with peers and instructors (Shuler et al., 2010).

4.1.2 Mobile learning

Various studies (Danesh, Inkpen, Lau, Shu & Booth 2001, Inkpen 1991; Mandryk, Inkpen, Bilezikjian, Klemmer & Landay, 2001) show the potential for bringing mobility, and portability to face-to-face CSCL environments when students are wirelessly interconnected by handheld devices (MCSCL). This technology permits the creation of natural collaborative environments (Inkpen, 1991; Mandryk et al., 2001, Imielinsky & Bradinath, 1994; Zurita & Nussbaum, 2004). In MCSCL environments using handhelds, group members can move freely, allowing flexibility in social interactions and the formation of groups. Pachler et al. (2011) have noted that “mobility in learning has new meanings as the locations and social spaces in which work is carried out diversify and work itself becomes mobile and distributed” (p.36).

The definition of mobile learning, especially in higher education, is not clearly defined when we look the literature of the subject. To construct a fixed meaning for mobile learning is untenable as mobile learning is the summation of multiple, evolving concepts (El-Hussein & Cronje, 2010). Colley & Stead (2004) titled their mLearn 2004 paper as ‘Mobile learning = collaboration’. In addition, discourse on new technologies often involves a miscellany of terms and preliminary conclusions that represent a wide range of uses and functions (Guri-Rosenblit, 2005).

El-Hussein & Cronje (2010) describes mobile learning as “any type of learning that takes place in learning environments and spaces that take account of the mobility of technology, mobility of learners, and mobility of learning” (p. 20). Cobcroft, Towers, & Smith (2006) states that “mobile technologies are able to support learner’s engagement in creative, collaborative, critical, and communicative learning activities” (p. 25). According to Frohberg (2008) mobile learning processes can be described as “pedagogically motivated, sustained practices (learning, teaching, learning support and learning logistics)…, when mobile computer technology is used to a substantial extent in mobile contexts and this clearly adds value or at least causes a significant change in behavior.” (p. 5). Mobile learning supports a social constructivist view of learning because it enhances student’s ability to learn and apply course content in context with other students (Bryan, 2004). It appears that one way to capitalize on information access for learning is to maximize the collaborative potential of mobile tablets (Rossing, Miller & al., 2012). Pachler et al. (2011) have noted that “mobility in learning has new meanings as the locations and social spaces in which work is carried out diversify and work itself becomes mobile and distributed” (p.36).

4.1.2.1 E-Portfolio as an example to utilize mobile devices in learning

When thinking vocational education and the storage of gained experiences and achievements, e-portfolio serves the goal to form a whole picture; an entity of things that are constructed on each other. This is the place where reflection, learning and constructive communication takes place for its further perception in learning process.
Mobile devices appropriate use in quickly changing situations ensures the storage of learner’s implicit information and actions. Mobile devices can be used to collect photographic, video, audio and text evidence. The advance of social networking websites affords opportunities to migrate evidence to social networking sites structured as e-portfolios and it enables better co-operation between different stakeholders. An e-portfolio is used to store evidence of a learner’s skills and knowledge acquisition digitally. It can be utilized in collecting evidence to support competency-based assessments and to describe or provide a historical narrative and/or showcase learner’s achievement (Pacler et al., 2011, p.95).

Butler (2006) has taken up benefits of portfolios, things related to their utilization and requirements for carrying out and supporting successful learning portfolios as efficiency to search through, retrieve information from, reshape and sort; it supports multimedia and is easy to share with stakeholders (Butler, 2006 in Buzetto-More, 2010, p.178).

4.2 Web-generation and learning

For almost a decade, institutions of higher education have been looking for ways to put cell phones to good use in the learning process. “The question is: How is the wireless, mobile technology affecting pedagogy?” (Bryan, 2004). Young people's way to learn has radically changed along mobility and its extension to the new ICT technology (ibid). A Canadian Professor Don Tapscott (2009) describes information technology era born children and young people as “web generation”. He describes concretely many things that web-generation makes otherwise:

- “Web- generation does not always start from the beginning.”
- “Web- generation sees things differently.”

Tapscott (2009) states also that web generation studies should move from teacher-centered instructions into interactivity because web generation’s way to learn is very different from that of previous generations (Tapscott, 2009). When life situations can be stored, transmitted directly to the site and to share between the students, we end to deal with the challenges that student face outside the school walls. According to Webster (2006) the latest technologic, industrial and social changes in the society caused by the new information and communication revolution mark the features of the new Information Society. At the moment perhaps the most significant ICTs phenomenon is social media or Web 2.0. It refers to services that are based on user generated content and participation, as well as the interaction between them in many different ways. The most typical examples of social media are blogs and wikis. The mobile Digital Narrative Tool enables students to engage collaboratively in the creation of a collective digital narrative (Arnedillo-Sánchez, 2008).

Information seeking and learning are closely interwoven in constantly on-going human activity (Case, 2007; Limberg & Alexandersson , 2012). The amount and importance of information is constantly increasing. Some of this information is aging rapidly and the utilization of newer information is a trend. We need intensely more theories and practice that bridges between formal and informal learning, didactic and experiential learning, peer based and master-based mentoring, local and distributed learning, the cognitive and the social dimensions of learning. We also need to explore new kinds of computational
platforms that can enhance the potential synergy between these contrasting pairs (Goggins & Jahnke, 2013). According to Thomas (2005), learner-created content refers not only to the creation of text, images, videos, music, or hyperlinks, but also to the construction of a locational and situational framework for where and when learning will occur: ‘There is a time and place for learning; it should be a learner’s time and place’ (p. 3).

According to Weber (2003) globalization, and the information technology revolution are changing the world at an increasingly rapid speed; students are more mobile, good education can be offered thanks to new media, and the supply of education, as well as the production of new knowledge by private -for-profit organizations, is increasing. Universities are ahead of new challenges in all aspects of their activities: the nature of their students, the way they deliver knowledge and do research, the way they interact with the civil society, business, the state, and other universities, and the manner in which they manage their main asset, their human resources (p. 5-6). Strategies must be developed to ensure that institution will be responsible to the needs of the people in the year 2000 and beyond (Balamuralikrishna & Dugger, 1995). Lawton et al. (2013) conclude in their research: “Horizon Scanning; what will higher education look like in 2020” that education providers enter international networks to share expertise and resources, as a means of remaining competitive (p.36).

According to Ilomäki (2008) the nature of technology has changed from a technical evocation towards communicative connotation, thanks to the development of new applications in the Internet. This has increased the use of ICT dramatically. At the same time, there can be noted that the access to ICT has increased among students and teachers; both at school and private (p.11). Communicative approach emphasizes the social and communicative aspects of information seeking practices. It challenges concepts of information seeking as a predominantly individual and generalized process, which does not have to be adopted and which is unaffected by its context. Hence, information seeking practices of various kinds are understood within the context in which they are carried out. The approach corresponds to an increasing awareness of the socio cultural aspects of information seeking, a perspective that has gradually become more apparent (e.g., Alexandersson & Limberg 2003).

4.3 Traditional vs ICT supported learning

When speaking of traditional teaching, it’s associated to teacher- centered action; mostly prepared and lead by teacher only where the tasks and ready instructions are given by teacher. It emphasizes memorization of facts and objective information, where correct knowledge is paramount as well high test scores, grades and graduations are considered relevant. Traditional learning is seen as an individual learning style whereas ICT supported learning bases more on collaboration, co-operation and networking. Problem based approach; promoting working life demands to future professionals are core in ICT supported learning.

The use of technology in teaching is not to transform but to maintain and support the existing practices; according to Cuban (2001), most teachers that use technology tailor the use to fit the familiar practices, not to revolutionize them. Teachers ICT-related pedagogical competence is crucial to create student-centered and collaborative, inquiry-oriented teaching practices, as well manners that support students' authentic activities,
independent work, knowledge building, and students' responsibility (Ilomäki, 2008). A survey, “Teachers Learning with Digital Technologies” (Fisher et al., 2006) emphasizes teachers’ learning process to be more explicit instead of traditional implicit assumption to teach. A performance-driven culture (OECD, 2005), endorsed by curricula as well many educational establishments and assessment are underlying factors that affect to schools learning and teaching culture. Although teachers’ knowledge encompasses knowing their subject and strategies to teach, it is obvious that rapidly changing world forces to learn and to teach in ways they have never been taught (ibid). In particular when learning about technology, teachers should be given opportunities to engage in purposeful activities (ibid) in which the affordance of technologies are made explicit so that they can make informed decisions (Conole & Dyke, 2004). The skills or competencies that are required to be information literate require an understanding of a need for information, the resources available, how to find information, the need to evaluate results, how to work with or exploit results, ethics and responsibility of use, how to communicate or share your findings and how to manage them (Cilip, 2012). It has been observed that classes that combine ICTs with face-to-face traditional learning increase the engagement of students by intersecting learning styles (Cobcroft et al., 2006). Students expect in today’s society the ability to “work, learn, and study whenever and wherever they want” (Johnson et al., 2011, p. 3); and on the contrary, if this expectation is not met, students experience frustration.

Kuhlthau (1993b) makes good arguments for considering uncertainty as a beginning stage in the process of finding information (in Case, 2007, p.54). When there is provided space for students' own knowledge exploration, experimentation, and also for the failures in the learning process, the taught subject does not necessarily seem as clear-cut as the teacher-led instruction, but rather reminds the reality of working life to which students should get used to during their studies. Practical learning generally requires real hands-on experience, but an increased use of e-learning can usually improve teaching and learning in both settings (DG education and culture, 2005, p.166).

5 Theoretical framework

5.1 Mobile learning theory

A theory of mobile learning is relevant concerning the role of mobility and communication in learning environments. (Sharples, Taylor & Vavoula, 2005). According to this theory, students learn across both space and time and move from issue to another. Learners move in and out of engagement with technology. The core thing in mobile learning theory is that it is the learner that is mobile, not the technology (Shuler, 2009). Learning can be interwoven with activities part of everyday life as devices are ubiquitous.

Stones (2011) approach to mobile learning and - technology presents mobile devices utilization as a tool for evidence gathering, information management, as an aid to reflect on learning and experiences occurring in the workplace (meaning also schools), e.g., “capturing moments in the classroom that would help with the writing up of an assignment later” (Stone in Pachler et al., 2011, p. 80). Stone’s case studies indicate that the learners consider the mobile technology of exceptional help in their learning and the access to wireless networking increased mobility. The portability, light weight and small size were considered as work facilitating features in device. Also digital storing of
done work e.g., in a form of blogs was promoted along devices use among students. The students used devices to develop visual material of their work process; in addition to photos, the students used devices to video and voice recording to capture evidence. Stone’s project finding indicates that mobile technology does have a place in a flexible working environment to be adapted in various disciplines. As a result, mobile learning will be an important cornerstone in the development of critical, creative, collaborative and communicative skills of the learners (Stone in Pacler et al., 2011).

According to broad literature review of mobile technologies and -learning, the challenge for both educators and designers is one of knowing how to use mobile tools in the most meaningful way (Naismith, Lonsdale, Vavoula, & Sharples, 2004). As mobile technologies are becoming more ubiquitous, the greatest challenge will be to “discover how to use mobile technologies to transform learning into a seamless part of daily life to the point where it is not recognized as learning at all” (p. 5).

Dede observed four fields where scholars, practitioners, vendors, and policy makers converge in discussions, implementation, and support of educational technologies: devices and infrastructure, safety and privacy, digital assets and assessments, and human capital (Dede & Bjerede, 2011). Dede proposed alternative models of educational improvement that can be supported by mobile technologies. Revolutionary change focuses on mobile broadband to be used to expand human support beyond the classroom and school day, and thus invent new structures for formal education. The change involves mobile devices being part of a strategy for eliminating inflexible, traditional methods of education. Stone’s (2011) work- based learning theory promotes reflection in practice by using mobile devices; formal learning taking place in the work settings.

Shuler (2009) identified core possibilities in mobile learning such as the promotion of anytime, anywhere learning, the ability to reach underserved children (low cost, high accessibility), the ability to improve 21st century social interaction, the flexibility to fit into diverse learning environments and the ability to enable a personalized learning experience. Shuler states that there are five primary goals for mobile learning; it is important to invest in understanding the development of young people who grow up in a mobile world. It is necessary to develop educational interventions that are scalable, and most importantly build tools where educators can develop. Teacher preparation is essential in a mobile world, and leadership must be present in a school setting in order for mobile learning to succeed.

According to Ling (2004), mobile devices have social consequences, particularly in private settings. His finding was that the adoption of texting among young people has changed the nature of mobile communication. Limberg et al (2008) identify self-directed learning to be critical for students’ possibilities to construct knowledge. Lombardi (2011) describes that the role of the educator is to encourage and enable the learner, into more self-directed learning, by providing access to appropriate resources without obtrusive interference. The learning goal is high order learning of procedural knowledge, strategy, reasoning, abstract analysis, and development of expertise (p.139). Abbott (2007) sees the potential of eLearning especially in supporting and enabling social inclusion.
Technological, social and economic trends are changing the skills needed for citizenship and employment. There is a wide diversity in how mobile technologies have been used to support the development of the 21st century skills (Cobcroft et al. 2006). “Where the use of social networking software was successfully integrated into the learning process it was seen to be of great value – especially for group working for part-time and distance learning students. Facebook was favored as a collaboration tool.” (Glamorga in Stone 2009).

Stone’s findings indicate further that student and staff using mobile technology need to be supported with the use of technology, and consideration has to be given to the context in which the devices are being used. The learning process and usage of mobile devices should be well-structured as it improves engagement in on-line discussions in different channels (Stone, 2011).

5.2 Analysis of the background and theory

The illiterate of the 21st century according to futurist Alvin Toffler, —Will not be those who can’t read and write, but those who can’t learn, unlearn & relearn.

The evidence shows that the networked technology enables people to communicate, share information and learn regardless of their location (ibid). This is one core of my study and a source of interest towards the subject. I have a personal desire to study new ICT possibilities to be utilized in vocational education, so the studied literature and pedagogical approach gave truly an exciting exploration into this subject. The identified works gave not only new insights and ideas, but they also fed and supported my own assumptions and findings of the matter. My curiosity was to get evidence of ICTs use in various disciplines in vocational education in Finland, not least because the use of new ICT has been topical and discussed by several institutions lately. The impulse to study this subject arose from the published research (ibid) by Ministry of Education and current press articles (ibid) concerning ICTs use in Finnish education.

The studied literature about ICTs suitability to various subjects (ibid) to be used in vocational education is parallel to my study in several respects. The received feedback and literature showed that different learning perceptions and learners require also multiple teaching methods and tools, including mobile device supported means, which offer possibility to learner to share both explicit and implicit knowledge better. In vocational education many things are involved with practical, “made by hand”-processes and include implicit information. Practical learning generally requires real hands-on experience, but an increased use of e-learning can usually improve teaching and learning in both settings (DG education and culture, 2005, p.166). The nature of vocational teaching i.e. many things are practical and needs to be done by hands, caused maybe most pondering to formulate my questionnaire so that the answers would include the feedback I wanted to get. The position and statement of Finnish Board of Education towards mobile learning (ibid) in general were an encouraging fact for me to enlarge the viewpoint to vocational level. The trends are showing that mobile tablets use will overtake desktop usage in the future and ICTs wide integration to into teaching and learning is obvious. The student’s mobility urges also the ability to “work, learn, and study whenever and wherever”. This is the reality of working life that has to be integrated to education as well. The feedback in questionnaire reflects the awareness of
these demands- teachers were looking the matter from working life requirements and saw ICT as necessity for pupils.

The theoretical framework for research on new literacy and Web 2.0 tools includes both cognitive and social interaction perspectives. (Whittinghamn, 2013) Cognitive approach seeks to understand the skills, strategies and dispositions required for effective online reading comprehension (Coiro & Dobler, 2007; Jetton & Shanahan, 2012). When the word “learning” is added to the definition, it now becomes “knowledge on the move.” The identified works indicate that mobile learning is not necessarily associated with physical movement. This, in turn, gives new dimensions to manage information and its sharing. In the context of vocational learning, the “tasks in school” can be organized into projects that are interleaved with everyday activities. According to Vavoula (2004) learning needs emerge when a person strives to overcome a problem or breakdown in everyday activity. This was also noted through received feedback and it is an important part of mLearning in vocational level. The literature indicates that new ICTs can facilitate and give new dimensions to learning in different environments and context. This was an essential fact both when I constructed the questions and analyzed the feedback; the theoretical framework in my study is about to understand how and by what means people engage with their surroundings to learn with new ICT. The questions I used in my survey aimed to find answers that how teachers use mobile devices in their teaching, what are the experiences and what is the main outcome of the devices use in vocational context. The done research guided me to construct the questionnaire/ gain ideas to formulate the needed questions.

According to socio cultural perspective the people learn besides the formal learning environments also in non-formal settings, contexts and situations that are not perceived to be traditional studying. This perception emphasizes that people do not just passively respond to the expectations of the world around them, but are active, and for example, will create themselves new learning situations in which they can develop their skills (Opetushallitus, 2010). “The use of socio-cultural lenses does reveal how learning at work is embedded in production processes and social relations… easing and improving work-based learning through mobile technologies” (Pacler et al, 2011, p.30). It can be concluded, that mobile learning supports learning processes through information and communication technologies. Due to more affordable technology and improved digital networks, many people turn to mobile devices as their first choice for connectivity. Findings show quite clearly that mobile technologies are able to support learner’s engagement in creative, collaborative, critical, and communicative learning activities.

Social Medias feature to produce and comment on what others say and think and share your own and other people's knowledge has amazingly expanded ICTs abilities to disseminate communication to outer world. Stakston (2011) describes social media as something that "provides opportunities to share what you are doing and know what other people think" (p.12). According to Carlsson (2010) social media is not about technology but "first and primarily about communication, conversation and relationship-building, interpersonal” (p.10). Mobile devices and ICTs suitability during work-learning courses is excellent. A closed Facebook- group is a perfect interactive place where students can share experiences, pictures and communicate with other students and teachers. It serves also as a “job-learning diary” and as a method to evaluate students learning. It is obvious that the Social Media is and will be a part of schools everyday life. Concerning new ways to teach and rethinking of needed core
methods and tools that mobile devices offer, there seems to be an ongoing discussion around these issues. The fact that Social Media has many faces and it can be used to wrong purposes as well (also during lessons), came up in the studied literature and feedback. The awareness however of this feature is the core thing to be understood. As mentioned before, the use of device has to bring some value and the pedagogical frames must be designed to be used with ICT.

As mobile learning is discussed a lot inside schools today, I wanted to scope what are the main findings among the subject to be used in vocational education. The done studies as well as the received feedback were parallel in many aspects, e.g., a person’s attitudes to technology can be influenced by what others around them think about it. When analyzing the received feedback, the awareness of already made notions helped to understand some discrepancies (to pay attention to attitude, problems in the beginning when teachers started to use devices etc.). The evidence shows also that by providing information when it is needed and relevant, learners can better choose what they focus on and what they try to remember.

The studied literature constructs the fact that the appropriation of technology leads to new ways of learning and working and it also sets up a tension with existing technologies and practices. When analyzing the received feedback, it was obvious that mLearning increases access for those who are mobile or cannot physically attend learning institutions. This fact was pointed out in the studied literature as well. For me this states clearly that there is a place for mobile devices appropriate use in vocational teaching. The responsibility of learning is also moving to the learners as are the aims and needs of learning, which was stated both in received feedback and studied literature. It can be noted that there is an increased orientation to working-life way to learn and teach- this also connote to the need to foster the demanded 21st century skills.

According to Stone (2011) mobile devices serve as a tool for evidence gathering and as an aid to reflect on learning and experiences which can be carried out to various substances; e.g., visualization of work process, which can be saved by students in form of pictures and videotape. The done material serves as a visualized teaching material to whole group and it facilitates the return to past situations that need to be “observed” again. As mentioned before, a learner can obtain understanding by visual means besides theoretical way to present information. In this meaning, mobile devices serve blended learning perception. Mobile technology solutions ability to add student’s motivation, impact on retention and achievement are showed by previous research. The functionality of interactive communication channels (e.g., Moodle) is seen as an enabling tool for students to gain access to resources associated with learners’ course as well as an activating method to increase participation. The meaningful use of new ICTs requires information literacy skills by learner. It includes a set of abilities to seek and use information in meaningful ways related to the task, situation and context in which information seeking practices are embedded (Limberg and Sundin 2006).

The essence of mobile learning and social learning are key examples of the new learning trends; they are obvious to initial and continuing vocational education and training in Finnish vocational schools. The evidence shows also need for innovative learning practices, so that pupil can learn a new era civic skills already at school. According to studied research, teachers feel they need for additional support and training to demonstrate appropriate knowledge and expertise to adapt convincingly new
technology in their teaching. It was stated that around 70% of students at all grades are taught by teachers who have engaged in personal learning about ICT in their own time. This demand was reflected by respondents and it seems that many schools still need more support from management to successfully adopt new ICTs into learning environment. Teacher don’t only need education to use devices and sufficient amount of devices to be used in teaching but also more clear framework to utilize these in schools.

It has been indicated that supporting teachers in integrating technology into teaching promotes beneficial pedagogical outcomes (de Winter et al., 2010). The potential for success in using new technology is dependent on the instructor, and the literature refers that support for instructors is vital. To analyze this in my study’s perspective, it can be noted that not only teachers’ preparation and role as an instructor is essential in a mobile world, but also the leadership to be presented in a school setting in order for mobile learning to succeed. As reflected in done research, the teachers’ role has changed. The web generation studies should move from teacher-centered instructions into interactivity because web generations’ way to learn is very different from that of previous generations. The desire to more learner-centered curricula and to teach with 21st century demands were strongly noted both in studied literature and received feedback. It seems that we are moving towards this direction inside schools although there are some obstacles to be won. The awareness of facts helps those who struggle and work with these matters.

6 Method

6.1 Selection and choice of method

The research design was inspired by survey research, which is often used to assess thoughts, opinions, and feelings (Shaughnessy, Zechmeister, & Jeanne, 2011, pp. 161–175). I used online web-questionnaire as a method to collect data. My experience as a vocational teacher is reflected as observations in my survey. I have used both qualitative and quantitative methods in my research. The data was collected using a set of questionnaire comprises of 18 questions. The characters of asked questions in questionnaire were both quantitative and qualitative. In the questionnaire, the teachers were asked to reflect on their experiences and attitudes of using mobile devices in teaching by 10th January. The reflection of received data was analyzed by using content analysis method.

I chose to conduct an online web-questionnaire via professional face book- groups to people who teach or have experience and views of vocational education. The empirical literature of the subject is studied besides to research made in Finland to research made of the context by other countries too. We need more emphasis and experience to mobile devices utilization largely from other countries perspective as many surveys point the low usage of information and communication technologies (including mobile devices) in Finnish schools (ibid) when compared to other countries. The reason for my choice of questionnaire was that it gives possibility to reach many people and their opinions around the subject without visiting on place. Used method serves my aim to perceive experiences of mobile device use as a facilitator of the learning process; information sharing, communication and collaboration in vocational education. Problem based and
workplace-oriented ways to use and benefit mobile devices in teaching/communication are crucial in my study. Vocational education includes a lot of orientation to real work situations and processing information in learning by learners own problem solving ability.

The sent questionnaire was aimed to persons in multiple disciplines who work, teach or study mobile devices, e-learning, social media in education and new technology in learning and education. Mobile devices use in studied context does not have to be tied into certain discipline or subject, so my intention was to reach vocational teachers and specialists widely, who have experience of mobile devices utilization in teaching. The reason to focus in this group was my desire to catch experiences of mobile learning/teaching related to vocational subjects which usually are not so emphasized to theoretical matters but to practice, ”handmade-things”. The challenge was to grasp some views of implicit working process; the appropriate ways to use devices in vocational subjects, different situations and get practices and experiences of mobile devices utilization in communication, collaboration and information management.

I approached my target groups by introducing myself with a short cover letter of the study and its purpose. I asked first if there was anyone who has experience of using mobile devices in teaching and I shared online link to questionnaire with following cover note:

Hello vocational teachers!
I teach vocational subjects/clothing in Finland and at the time making my thesis of "Mobile Device Supported Information Searching and Competence in Vocational Education..." You are invited to participate in a survey to get your feedback and opinions on the affects of using mobile devices in vocational education (link to questionnaire below). Your participation is appreciated, completely voluntary and anonymous. You may choose to skip any question you do not want to answer. I look forward to get answers by 10th of January 2014. Thank you in advance!

Link to questionnaire: http://bit.ly/1eHVjFj

I also informed later that I can be contacted via Facebook/chat for further information and pasted some reminder notes of responding to the survey in due time. The received feedback which I got in Facebook was positive; the subject was perceived as a necessary and interesting topic and I was asked to send a short presentation of the received results to group members after the survey is done. There were 16 received answers by informed deadline. To serve as a blending of quantitative and qualitative research, the amount of feedback related to number of respondents was sufficient.

6 Presentation of results

The received feedback in questionnaire reflects to studied literature in great extent. The comments of mobile devices and ICTs utilization to vocational education as a learning tool show that there can be noted an increased interest and willpower to do things differently. Many schools have already either used, have the intention or will to use mobile devices in teaching. The presentation of results is reflected from the perspective of surveys research questions. The feedback was received from 16 vocational education providers in Finland. The respondents work as a teachers in different disciplines/courses including: Clothing, International business and culture, Electronics / computer / electrical engineering, Entrepreneurship, Wood working/timber, Tourism, Catering and
economic, Hotel and restaurant, Restaurant chefs, Nursing and care, Job search coaching, Native language, Italy, French, Spanish, Swedish courses, Math, physics and ICT, Business and customer service& sales, Visual arts, Beauty care. Comments included also feedback from teachers who teach groups of students with individual plan (need more support in their studies) & professional start-up groups.

The mobile devices were used among following vocational context;

✓ Job sharing and storing the notes to the cloud, job searching and applications to use several offices tools. To recruitment and job interview, meeting, regular meeting / web conference.
✓ Math, Physics, simultaneous teaching together with vocational studies.
✓ Customer service and other competitive tools, sales and services work.
✓ Video recording and -shooting, photographing.
✓ To complete and make reports by using mobile technology, to control student’s internship by using Facebook and on e-learning courses by using the Moodle learning platform.
✓ In making a digital book during the course of French for Beginners 1.
✓ To produce content with mobile devices by using different applications; e.g., Explain Everything, Mindjet.
✓ In kitchen education; students photographed dishes at school and at home and used devices for searching recipes.
✓ To maintain a learning diary/ Blogger and joined closed FB-group via Moodle, which was experienced as a good basis for learning and FB as well blogs supports it fine.
✓ In ICT, office services, building construction and to do how-to videos related to electrical installations that will be QR-stamped, which means that a pupil receives instructions to the mobile device by scanning the QR tag.”
✓ In tourism e.g., in familiarization of trips to tourist destinations by using photos and videos. Also integration with theoretical subjects as e.g., different language courses, the comprehension of text: vocabulary, idiom and listening comprehension & the search of pronunciation instructions.

What are the opinions of Finnish vocational teachers about the possibilities provided by mobile devices in teaching?

The received results of mobile devices affects in teaching were noted by respondents in a form of increased communication, student-centered, work-based and collaborative way to work “The skills of past year students vary, but the experiences have been positive in applying to information retrieval; skills have already developed”. It was reflected from the answers that the teachers want to learn more about devices utilization into teaching. “I’m going to... courses to learn more, now I do not know how to take advantage otherwise... you just have to find appropriate applications; smartphones are bent today for many.” The positive feedback was encouraging in some extent by all respondents; “FB delivers the information to its destination in a second! At first I was very skeptical. Good and inspiring experiences.” Description as well documentation of learning, at least in the food industry is really inspiring and easy, thanks to mobile devices. I highly recommend.”

The sustainable pedagogy and approach to teaching was noted in feedback; “Using of devices and cloud solutions can save you time, money and effort: the copy is reduced
(my goal for this year to 70% decrease), teachers do not have piles of paper being checked, it is easier for the students to enrich their own notes and to share work. The notes are always with you where you go... We also use video recording and photographing which both ease the learning of many students”.

14 of 15 respondents considered that mobile device is more suitable than desktop or laptop computer. The main advantage was mobility: “You can move away from your computer”, motivating affect on students, ease of use and speed, small size, students know how to use, students learn to share their work online and it supports cooperation; “The tablets are well suited to teaching, they are handy to use. Many applications, videos, photos, funnies, etc. ... math applications...” The feedback of devices impact to students attention to tasks was as follows: in great extent (5), to some extent (8), no remarkable difference (3).

Mobile devices were considered helpful because they release the teacher from preparing accurately notes for students to copy; teacher gives a question to which students search answers and they are discussed and reflected in groups. The mentioned negative side of mobile device was its poor ability in word processing and it was also noted that mobile devices should not be compared with desktops; “they are different devices, and both are needed”. The finding in literature and feedback has the same line of traditional desktops necessity in some extent. For now we need also desktops and their use is justified because of e.g., better text processing and saving options they have. In the future the portable devices will surely develop to cover these features too. The speed how technology expands will bring something that we cannot even imagine at the moment along the coming century (22nd).

The use of mobile devices can harass some of the teachers and they do not want to use devices, either to learn to use them. This relates to a feedback, that people are afraid to try new things, but there should be remembered that the teacher does not have to be all-knowing; students learn to find answers to their questions themselves. A fear was also that ICT and the use of social media in teaching ties teacher in taught matters day and night. “Tough job just to make the material to the task bank!” The integration of the teaching with devices to daily work was considered challenging at times, but also the benefits had been most apparent, when interaction and accessibility got faster. The fast interaction means also that “Among the disadvantages I experience the fact that it is addictive to a teacher, and working limits disappear; I read blogs and according to students upgrade FB too often...students hope to get an immediate feedback on their actions; the learning of applications requires the teacher's time and courage, especially when the technology does not always play the way it should.” As mentioned before, students are skilled to use devices and ICTs. Teachers could handle occurred problems as a part of problem-based learning, reflecting to real life situations; “students learn quickly and find solutions also to technical problems”.

The benefits appear after difficulties and slow start “i.e., from the teacher's point of view, the leaving of tasks in time takes place more robust, students learn to share their work online (open, no need to copy), students learn how to co-operate without need to agree a meeting place elsewhere than to the network. The works are of better quality i.e. they can be read (for some student’s handwriting is really lousy).”

Besides inadequate equipment “The lack of devices has blocked the extended use of devices. When the device is used for loan, there has not been possibility to build a
permanent practice of its use” and the support from management, teacher’s attitude to make things by new way seems to be the biggest obstacle in using mobile devices in teaching. Although several teachers reflected enthusiasm towards innovative ways to teach and new learning methods, there appeared also opinions such as: “can we require that all students use smartphones and do teachers have enough competence to adopt them into teaching?” There can also be students who do not want to use devices or do not have their own; "Surprisingly, the big problem is, if some of the group does not want to use some service. Then to one or two has to be organized an alternative method.”

The preparation of the right pedagogical content was experienced challenging and the importance of peer groups in using mobile devices was considered essential. Schools should not only support more in adoption of new technology, but also in building more positive and encouraging approach to use devices. Teacher’s inexperience in using mobile devices was seen as a recessive problem. The problems in contrast, appeared in students motivation to use devices to learning and concentration during lessons; “students can easily get “side-tracked” into Facebook or other social media.” Young people have used devices most to gaming. “Part of the students have problems; some have their own equipment and the use is familiar yes, but they do not consider the devices suitable for teaching”.

The feedback, if there had been difficulties to control the appropriate use of devices during teaching, was considered by respondents as follows: not at all (4) to some extent (10) a lot (1). The answers reflect that the new working culture needs clear defined frames inside organizations both to teachers and students. “There should be guidance, instructions and more focus on the management of students”. When the content and methods of learned substance have been clarified, mobile devices can be used for many; “Suitable for all, where the working is goal-oriented and spontaneous.” Instructor's role becomes more important because students must be guided to the roots of the data and present inspiring questions to students that they look forward to take part to lessons. Not designed lesson may lead to sub functions as: “Students can produce not appropriate/ unauthorized stories via social media!” Today’s students are clever to use smartphones and their social extensions as Face Book and other similar channels, but do not know how to use devices in information retrieval in studied context as reflected in received feedback; “students do not know how to use other sources”.

Although mobile devices were considered suitable to be used in teaching of almost all kind of context, it is necessary to consider devices purpose to taught substance and proper pedagogical framework; “It is essential to think about usability in the sense that the new service / tool will bring some added value; the use for entertainment only does not support the meaning. The most tangible benefit until now has come from the fact that some things experienced difficult in the past can now be done with less effort and more appropriately by using mobile technology.”

It must be noted also that “In mobile devices there exists also the "other" life, so disturbance is caused because of calls, SMS messages or similar messages during a moment when the concentration is needed. I think the problem is the fact that the students are so dependent on the phone that you cannot imagine to do nothing without them - it has already become a negative correlation (e.g., in relaxation moment; SMS
messages ruins everyone’s moment). Teachers reported that the students are positively directed towards mobile methods in general, but everyone does not have an own device.

The received feedback above reflects the importance of teacher’s role as an instructor and the meaning of common rules which have to be clear and accepted by all parts; “I make it clear at once that using of devices is allowed only on my authorization and only in teaching and students have followed this quite well”.

What are the experiences of the Finnish vocational teachers of the changes introduced by mobile devices in their courses?

“Absolutely an awesome tool in communication; informing for example, essential between a teacher and a group e.g., in a form of a blog or a group where you can connect other stakeholders/ people outside if needed.” Visual dimension of documentation and producing of learning material of real working situations by learner were emphasized by respondents positively. Mobile devices were used to repetition of previous things, the outcome of pondering i.e., to display learning and to test competence. “For example, the practical work could be videotaped, and to be introduced new ways of working to the whole group. “As an example from my own substance; the situations when the garment is being fitted, the fitting could be videotaped and the video clip could be showed to the whole group later. Here, the whole group can see how the garment turns to fit in the fitting session and it’s easy to return to the matter later, as the information is stored. Mobile devices were used to information retrieval and implementation. ”Enrichment of personal notes, visualization, sharing; in all to information retrieval” Mobile devices were considered to be used in information searching in growing extent; “In the future, more and more searching instructions with the help of QR tags.”

“Devices can be used in as large contents as possible, because then it's possible to see the progress of the learning process”. The work-based approach to learning reflects in feedback in a form of desire “to use ICTs integrated to various courses, making video conferences, webinars...” Devices were mainly used in information retrieval in several disciplines. Mobile devices suitability to working-life context reflected positively; they were used in communication among student, teacher and outer stakeholders e.g., during job-learning periods. “You can focus on practicing communication, I tend to observe, that the mobile devices and network are well-suited in grouping and to commit students to studying. However, even in this the active are active and the passive are passive, if there are things to be done.”

How does the working life requirements needed in 21st century affect in learning and teaching?

The gathered feedback of comparing ICTs and mobile devices to traditional teaching reflected strongly the demand to promote working life demands and skills needed 21st century. Mobility, group work and students skills to networking and co-operation were considered better along mobile devices use in teaching and it was noted that students are focusing in their work more. “Students' own skills and knowledge utilization in education”. The easiness to use mobile devices” in group work promotes students' own skills and knowledge utilization, teacher is no longer the one with the right information or its producer; the students have become more productive.” It was also noted that
teachers have to look things more openly and they “cannot hide behind the old learned knowledge.” This demand for teachers to unlearn from traditional way to teach was seen as core matter by the respondents who had worked with new ICTs and had colleagues who promoted traditional way to teach. The cultural change does not happen quickly and usually the younger teachers are those who represent the new way to benefit todays ICTs solutions to their work.

The teacher's role has changed completely towards 21st century. The traditional mission of schools has been to transfer knowledge and provide correct answers. Today’s regenerative learning culture and requirements force into different approaches to learning, information and knowledge. The global access to information and ICT supported teaching methods go beyond the spaces of text books and classroom. "The teacher directs and motivates to the sources of information, encourages and gives freedom. The teacher should be happy to deal with the fact that the expert in the group is someone else than the teacher. This is the great challenge.” Teachers are used to pull down information from the top and they fear the situation in which they cannot provide ready answers. Everyone are not interested in mobile devices, and do not see the opportunity they offer. Ahead of new ways to work, there is a lot of new content to work and deal with. The support from work mates was highlighted important:” I am not a high-functional with devices, but I have learned a huge amount and I would be willing to share what I have learned with my colleagues, but think that they do not have any interest. Always there is a question of time, of resources ”After the problems in the beginning are solved, the done efforts bear fruit and several benefits could be noted; the used time is freed up, because the students produce content themselves and then submit their output to the rest of the group and also openly online if they want so.”

“Project-learning abilities in a form of increased communication and collaboration as well students’ problem solving skills and initiative attitude” were highlighted along mobile devices use in teaching. Devices considered also important in developing professional skills that are needed in working life. The demand to follow outer world and todays skill requirement that education and working life have to deal with were highlighted; “The courses, which are based on current information i.e., to the time in which we live”.

“The ability to create, manage and handle information for future professionals of vocational education “was seen essential in received feedback. Students will learn “how to use e-services to create new ones (at least illustratively, if not otherwise), professionals will be able to sell things such as know-how in new ways.”

All respondents saw mobile devices impact either in great extent (6) or to some extent (10 ) as helpful for students to develop skills that apply to their later academic or professional career. Devices were seen as a motivating and activating tool for students to learn course material by 14 respondents. One reported that devices have not impacted to develop these skills.

7 Analysis, conclusions and discussion

When looking the opinions of Finnish vocational teachers about the possibilities provided by mobile devices in teaching, there can be obtained many possibilities, yet
not all used or discovered because of the short experience of using mobile devices. The main outcome was seen to use devices in information searching, communication and collaboration in various courses and between different stakeholders. The practicing of these skills during studies was noted to promote needed working life skill in 21st century.

The devices were used in all courses/subjects and the teachers reported that experiences had been positive in applying devices to information retrieval; student’s skills were developed”. The received feedback supports as well the adoption of new means of communication and cultures during studies and it was noted to have a strengthening affect to learners’ success in their later working life (Kalliala & Toikkanen, 2009, p. 10). The literature review in my thesis illustrates the tension between the tradition of school and the reshaped conditions for learning, linked to global economy and modern technological tools. When asked if the mobile devices have promoted the skills, needed in working life, the feedback included following answers “not at all” and the rest 15 “a lot” or “in some extent”.

My substance is clothing and as a vocational teacher, I have been thinking and discussing with colleagues, how to take advantage of mobile learning in clothing sector. For me it was encouraging to get support in received feedback to my own approach to learning with more working-based ways, e.g., by preferring more e-portfolios for students to illustrate their working processes. Many teachers see mobile devices as an extension to students as well teachers to co-operate with working life on-line and I think this is one biggest advantage devices offer. The huge change that mobile devices have brought to schools is that they enable more quickly reaction to issues on hand; this is absolutely an advantage and demand when doing co-operation with outer world. Teachers as well students can give and get feedback more quickly, which altered the opinions of its nature; the limits of the working hours are not clear and “you can be tied to these matters day and night.” I see this as a problem mainly in the beginning, when starting to use devices, but after basic functions are created, it costs you the done time back and freezes more time for teachers as noted in feedback: “…when the mobile is enabled, there is no need for teacher to prepare accurately notes for students to copy.”

The frames and limits to work have to be created both sided and for the teacher the devices should provide more helpful tools to manage the information flow. It’s essential to adopt new ways to teach where we involve students to take more responsibility for their learning, not only because the working life demands to this so, but also because teachers have a lot of other things to manage besides teaching. The steering of administrative things; managing of information flow and networking as well learning of new applications and technology are one big and growing part of teacher’s everyday demands today. As mentioned, teacher’s role has changed, so the way to work has to change as well.

Ahead of new challenges to carry teaching out, we need to study more flexible and multiple ways to teach, benefit available ICTs, share responsibility to students of their learning and support it with updated ways. New dimensions of documentation, video-picture and fastness to do things are some features that mobile devices supports. Teachers do not need only more understanding of how mobile devices can be used in teaching; as a tool for information management and searching, but also skills and attitudes improvement. As reflected by answers and the studied literature, the challenge
and possibility are to be encouraged to unlearn from traditional ways to teach, to deal with amount of uncertainty, which is natural when working with new things and to realize that the teacher doesn’t have to know everything. The specialist in the classroom can be someone else than the teacher (especially with devices) and we have to accept that along the new role to teacher; more as a coach to team.

Mobile devices open possibilities to the students themselves to provide the content in pairs or in groups where the teacher acts as leader and gives the big frames. The bridge to “interactive learning, i.e. students can find out THE expert who advises others and also the instructors / teachers” supports the idea of more problem-based and independent grip to learning (e.g., Opetushallitus, 2010; Dede, 2009). The obstacle to some teachers seemed to be to get the time (and an open-minded attitude) to develop the practices towards this direction. It obvious that there are problems in the beginning and the preparation in form of putting effort to studying the use of mobile devices, available and suitable applications and deciding right pedagogical frames to the taught content.

According to received feedback and studied literature, many teachers use their own time to learn mobile devices use and in addition it’s necessary to follow what new applications are available and suitable to be used in teaching. As many vocational education providers have not a long history of using mobile devices in classrooms (ibid), the support from administration was considered vital by teachers. Teachers seem to be willing to try devices use if there would be sufficient amount of equipment. To use them for different kinds of tasks, the students need their own devices. This kind of lines, how to promote new ICTs in schools, needs absolutely to be discussed together. The general lines have to be made visible to people concerned. The broad amount of literature support the need for teachers to get organizations and co-workers aid to get better started with successful adaption of new ICTs.

After the problems in the beginning when starting to use devices (not all faced these) are won, the feedback reflected encouraging results in form of saving time, money and effort. I.e. “the amount of copied paper has been reduced, teachers do not have piles of paper being checked...you have time to do other necessary things” ICTs have opened a remarkably great step to more sustainable direction in this sense, which is promoted not only in schools but as well globally today. It’s also obvious that when students are more responsible in what they are doing, they get clearer picture of their studying (the purpose), demands and dreams to their future plans. Devices support learning as they “go with you all the time” and are handy to use. Students know how to use devices usually better than teachers, so the documentation of e.g., working process (to be used when searching work), providing and sharing content openly and networking with outer world is something that device enables during the studies. As noted in studied literature and in received feedback, devices use during the studies help students to network with outer world (which is an advantage after graduation) and develops the skills that apply to their later professional life.

The experiences of the Finnish vocational teachers of the changes introduced by mobile devices used in different courses show an increased activity among students towards learned content. Teachers reported of student’s better ability to connect ideas by new ways, which also promotes work-based learning. The work documentation ability along devices brings new ways to introduce the working process to the whole group. When the documentation is stored/ videotaped, the return to handled matters is easier and it makes communication and information retrieval not only visible, but clearer and
transparent. When students have usually own devices, they can make the documentation also on their own time and share them in school. This kind of trend has been increased among students and it is a sign of ability to think more independently.

As stated by respondents and by studied literature, the ways we search and communicate information have changed (Cobrocroft, 2006, Tapscott, 2009). Teachers’ opinion was that technology has to be used in a meaningful way and it must be integrated to the teaching by using relevant theoretical framework that fits to the taught content. I believe that mobile devices appropriate utilization in schools and work processes will help to build supporting bridges to learn new ways to learn and ICT enables to build communicative bridges between different stakeholders. Recovery and adaption of new dimension of ICTs into teaching provides answers to several demands of skills that are needed in today’s information society.

People seem to react to change according to personal characteristics and such evaluations seem to affect their decision of accepting innovation. Rogers (1995), as cited in Johnson, Gatz & Hicks (1997), contests that a very small percentage of the population is what we call innovators; eagerly trying new things. The opinions from questionnaire reflected that there are usually some controversial settings between teachers and opinions of using ICTs in teaching. The reasons were mentioned as: The fear to do things differently, hiding back to safe, traditional ways to teach as they are tested and teachers’ lack of time and resources. These kinds of obstacles were although seen as recessive problem. Usually the greatest resistance was noted among older teachers with a long work history.

The studied literature and received feedback confirms clearly that mobile device supported learning and communication offers new possibilities to manage information and it promotes opportunities to link education to working life and new extent of job/work process documentation, which are essential to young people when the construct their professional identity. Effective communication of the innovation's characteristics is considered to be a key element in the transfer process (Johnson, Gatz & Hicks, 1997). When collaboration and communication skills are at the top of any employers’ desirable qualities (ibid), it is fitting we are broadening our views from traditional communication, information management and learning in vocational schools into new era. ICTs in itself do not bring anything more to learning, but they are important for the intellectual and social activities that learner with help of these instruments will do.

The mediation related to information seeking requires deliberate reconsideration as far as teaching contents and methods are concerned, and the development of a more complex awareness of what it means to be information literate. There is close interaction between the quality of students’ information seeking and the quality of their learning outcomes. (Alexandersson & Limberg 2003; 2005; Limberg 1998). New ICT does not mean that proven pedagogical methods should be dismissed, but rather to process them into new format. At its best, ICT opens new possibilities to combine heard, read and by own case- basis perceived matters into thoroughly understood information. To understand the communication and learning conditions requires knowledge of pedagogical approach to different types of learning situations to transfer information in various ways between different parties.

We give deeper meaning to information and ICTs (as mobile device) by using them in meaningful way (see e.g., Moyle, 2010) and in learning besides learning environment
by pedagogically right approach. The essence to think about usability and the value the devices bring was highlighted by respondents. By Fox (1983) notion of this same thing “if a tree falls in the forest and there is no one there to see it, then it conveys no information.” (in Case, 2007, p. 65). The low usage of ICT and mobile devices in vocational teaching in Finland refers to this kind of assumption; we may not have realized the possibilities and advantages of using them in the information flow we are surrounded; “it is difficult to distinguish the wood from the forest.” The 21st century skills that are highly valued by the employers, are natural characteristics of the web-generation, but formal education is still largely based on conceptions and practices that do not support the development of these skills.

As conclusion, the literature review and received feedback in questionnaire points the need for further and ongoing research and study on new ICTs utilization into teaching and learning. Wireless networks, mobile tools and new innovative applications will provide future potential for developing learning in vocational education. Globalization and technological change processes that have accelerated in tandem over the past years have created a new global economy and the circumstances concerning the 21st century. The ability and willpower to use technology, information and knowledge are crucial to be updated and prepared to face demanded working life skills.

8 Suggestions for further research

The journey of many experimental mobile initiatives has begun and this includes context specific opportunities we have not yet discovered. Included today are games, simulations, sensor-driven tracking and feedback, location-based, and “point and shoot” learning. Further research could include more discipline focused research, designed and developed applications according the taught content. A case study of carrying out iPads to different disciplines/ vocational classroom would be an interesting study to do.

Outcome from questionnaire, interviews and chats with teachers plus the study results have pointed to the desirability of further research in the following areas:

- To compare the two groups; traditionally taught group and mobile devices studied group.
- To collect good practices which also others than an expert teachers have been able to learn from the use of ITC in education
- How well educational institutions have acquired new equipment as tools for teaching and teacher.
- How to get the social skills concerning young men, better regarding speaking, speech, and writing! Distance learning via videoconferencing?
- Discussion usually revolves around the equipment. More essential is to think about the practices, and harness the power of technology to serve them.
- Study teachers skill level to use ICT and besides this the mobile devices. If teachers do not know how to use mobile devices in pedagogically relevant manner, we easily stuck in the grade level teaching method or are annoyed that the schools do not have enough computer classrooms.
- Using a mobile device specifically as a tool in students learning and competence assessment.
• Development of the study motivation and self-directed goal orientation. The teacher serves as a consultant- how would this work more naturally and more efficiently? The adaption and supporting of student's creative skills. Inventing by learning. The utilization of different knowhow between various disciplines by collaboration, pedagogy and different methods.

"Education is the most powerful weapon which you can use to change the world."
- Nelson Mandela-
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9 Appendix 1/ questionnaire

You are invited to participate in a survey to get your feedback and opinions on the effects of utilizing mobile devices in vocational education. Your participation is completely voluntary and anonymous. You may choose to skip any question you do not want to answer. Thank you in advance!

1. University/school and subjects you teach

2. In which courses do you use mobile devices? Describe the experiences/ways you have used them and results of using mobile devices in teaching?

3. Do you have any suggestions for further ways to use the mobile devices in taught content?

4. To what kind of courses/content mobile device is most suitable, why?

5. Is mobile device more convenient compared to a desktop or laptop computer

   Not at all
   To some extent
   Yes, a lot

6. What do you think are the two main advantages and disadvantages of using mobile devices in teaching?

7. How could you utilize mobile devices in communication, collaboration or as information sharing and searching tool between teacher, student and outer world? In what kind of situations? Is there any specific manner to use mobile device?

8. What has changed most in teaching along mobile devices if you compare traditional teaching to modern teaching methods?
9. Have mobile devices use increased students activity and participation?

- Not at all
- To some extent
- Yes, a lot

10. Have there been difficulties to control the appropriate use of devices during teaching?

- Not at all
- To some extent
- Yes, a lot

12. Has mobile device activity helped students to develop skills that apply to their academic career and/or professional life?

- Not at all
- To some extent
- Yes, a lot
13. Do mobile devices motivate students to learn the course material more than class activities that don’t use mobile devices?

- Not at all
- To some extent
- Yes, a lot

14. Is it easier to work in a group using the mobile devices than in other group activities?

- Not at all
- To some extent
- Yes, a lot

15. Has mobile device activity helped students to connect ideas in new ways?

- Not at all
- To some extent
- Yes, a lot
16. Have mobile devices helped to solve problems concerning information searching with students?

17. Is students’ attention to the task(s) greater when using mobile devices?

18. Ideas for further study on the topic? What do we need to know more of mobile devices use in vocational education?