DIGITAL COMPETENCE DEVELOPMENT OF TEACHERS IN FINNISH HIGHER EDUCATION

Case: LAHTI UAS

Lahti University of Applied Sciences
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                                    teachers of Finnish higher education
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ABSTRACT

Digitalization was the catalyst for this study, because it is one of the hype trends at the moment influencing education and society. Digitalization can support the learning process and enables learning at any place at any time. Concurrently, future education has to constantly respond to the rapidly changing requirements of the labor market. Continuous learning is required from the students of the universities, but also the employees within the universities have to adapt to the changes of operational environment.

The purpose of this Master's Thesis is to map the current situation of digital competence development in a Finnish University of Applied Sciences. The factors and barriers involved in this development are identified and development ideas are offered. The target group is the teachers of the organization. Nevertheless, the students are not ignored because they are closely related on the teaching.

The background of the study was the international reports concerning the current state of digitalization in education. In bureaucractic and inflexible organizational structures, especially the technical skills of the teachers should be developed in order to provide digitalized education. Therefore, literature related to organizational learning, learning processes and digital competences were examined. The empirical part of the study is a combination of qualitative and quantitative approaches. The current situation of digitalization in Lahti University of Applied Sciences was examined through preliminary interviews with 8 members of LUAS staff and management. After understanding the main challenges in the current state, a digital competence development survey was sent to LUAS teachers in order to clarify their digital competencies, training and development needs. The data was compiled from 27 volunteers among the teachers. These two study approaches were analyzed and the development areas were identified. As a result, the recommendations were provided.

A conclusion of the research was that, the digital competence development of teachers is underemphasized. The study underlines the importance of developing digital competencies of teachers, but at the same time the skills of the other employees and the students' skills should also be strengthened. The study also indicates, that the learning process is not bound to certain trends like digitalization. Learning is an endless process, as long as the prerequisites for the

learning, like motivation, awareness and recognition for achievements and well-being exist.

Undeniably, the involvement of the new trends and skills among educators will improve the quality of education. The outcome is increased competitiveness, high-class education and respected brand among students, teachers, other universities, local companies, international and domestic partners and the government.

Key words: digital competencies, digitalization, teaching, continuous learning, teacher training, lifelong education, organizational learning, competence development

Lahden ammattikorkeakoulu
Liiketalouden laitos

KOSKINEN, JULIA: Suomalaisen ammattikorkeakoulun
opettajien digitaalisen osaamisen
kehittäminen

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TIIVISTELMÄ

Digitalisaatio on tällä hetkellä yksi koulutukseen ja yhteiskuntaan liittyvistä polttavimmista trendeistä. Digitalisaatio voi tukea oppimisprosessia ja sen avulla oppiminen on mahdollista missä ja milloin vain. Tulevaisuuden koulutuksen tulee jatkuvasti vastata työmarkkinoiden muuttuviin vaatimuksiin. Oppilailta vaaditaan jatkuvaa oppimista, mutta samalla myös yliopistojen työntekijöiden on osattava sopeutua muutoksiin toimintaympäristössä.

Tämän työn tarkoituksena on kartoittaa digitaalisen osaamisen kehittämistä Suomalaisessa ammattikorkeakoulussa. Kehitysprosessiin vaikuttavat tekijät ja haasteet on tunnistettu ja näiden perusteella on luotu parannusehdotuksia. Kohderyhmänä tutkimuksessa ovat opettajat. Oppilaat ovat kuitenkin osa opetusta, joten heitä ei ole voitu syrjäyttää kokonaisuudesta.

Työn taustana ovat kansainväliset tutkimukset liittyen digitaaliseen oppimiseen ja oppimistuloksiin Euroopan unionissa. Opettajien digitaalinen osaaminen yhdessä joustamattomien organisaatiorakenteiden estävät digitaalisen koulutuksen kehitystä. Osaamisen kehittämiseen, oppimiseen ja digitaaliseen osaamiseen liittyvä kirjallisuus toimi näin ollen alkusysäyksenä tutkimukselle. Tutkimuksen empiirinen osa on yhdistelmä laadullista ja määrällistä tutkimusmenetelmää. LAMKin tämän hetkinen digitalisaation tilanne kartoitettiin haastattelemalla yhteensä kahdeksaa henkilöä johto- ja toimihenkilöpuolelta. Kun digitalisaation haasteet oli tunnistettu, kysely digitaalisen osaamisen kehittämisestä lähetettiin opettajille. Kyselyn tarkoituksena oli kartoittaa olemassa olevaa digitaalista osaamista, osaamisen kehittämisen ja koulutuksen tarvetta. Aineisto kerättiin 27 vapaaehtoisen joukosta. Analysoimalla näitä kahta lähestymistapaa pystyttiin tunnistamaan kehitysalueet ja luomaan johtopäätökset.

Tutkimuksen johtopäätöksenä on selvää, että digitaalisen osaamisen kehittäminen on aliarvioitu. Tutkimus alleviivaa opettajien digitaalisen osaamisen kehittämisen tärkeyttä, mutta samalla on vahvistettava myös organisaation muiden työntekijöiden ja myös opiskelijoiden digitaalinen osaamisen kehittämistä. Tutkimus myös osoittaa, että oppiminen ei ole sidottu mihinkään yhteen trendiin.

Oppiminen on päättymätön sykli, kunhan oppimisen edellytykset- kuten motivaatio, tietoisuus, oppimistulokset ja hyvinvointi ovat olemassa.

Uusia trendejä ja osaamista on kuitenkin liitettävä koulutukseen, koska se lisää koulutuksen laatua. Lopputulemana on lisääntynyt kilpailukyky, tasokas koulutus ja arvostettu brändi oppilaiden, opettajien, paikallisten yritysten, muiden yliopistojen, kansainvälisten ja kotimaisten yhteistyökumppanien sekä hallituksen keskuudessa.

Asiasanat: digitaalinen osaaminen, digitalisaatio, opettaminen, jatkuva oppiminen, opettajakoulutus, organisaation oppiminen, osaamisen johtaminen

CONTENTS

ABBREVIATIONS

BYOD-Bring your own devices

EU-European Union

HR-Human resource

HRM-Human resource management

ICT-Information communication technology

NMC-New Media Consortium

LUAS – Lahti University of Applied Sciences

RQ- Research question

UAS-University of Applied Sciences

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INTRODUCTION

This chapter explains the background, purpose and scope of the study. The research questions are also examined. The structure of the work is presented.

Due to a changing globalised world, technology plays a huge role in our everyday lives. It has become a prerequisite to have technological skills in order to work and communicate with other people in our knowledge-based society. The technology should be linked also to education, because the purpose of the universities of applied sciences is to produce suitable workforce based on the labor market needs. (Ministry of Education and Culture 2014a) Technology enables learning at any time and in any place and devices are connected to learning environment (Karran, McManus & Pohjonen 2003, 57-58). In the future, there will be increased need for higher education (Trow 2002, 311). Organizations are competing for well-educated and skilled workforce (Sydänmaalakka 2002a, 133). These knowledge workers need to constantly develop their skills and adapt to new technologies (Bates & Sangra 2011, 9-11).

The educational system is influenced by different trends. The universities must be aware of the future challenges in order to compete with other universities. Competence development in digitalization and other trends is essential for the teachers as well as the students. However, the amount of training has been underemphasized even though the high quality education is a prerequisite for the institution to survive in the competition between the universities.

The decision of combining teaching and technology must be part of the philosophy of teaching (Kanuka 2008). As stated in Bates and Sangra (2011, 96-101), the organization has to go through a radical change process in order to understand that the new innovations and new strategies should be supported. The whole model of teaching and the curriculum could be altered with the help of understanding the strategic importance of technology and innovations. (Bates and Sangra 2011, 96-101.) The strategic importance of providing digital education should be identified in Finnish universities, because the skills of the teachers are reflected on the students. The teacher has to be able to integrate pedagogic skills with digital skills and utilize these skills in the practice. When the teacher has the

competencies to provide digital education, students can be able to exploit their knowledge in work life.

Digitalization is one of the trends influencing the work market, so the universities must be aware of continuous learning requirements. When effectively utilizing the knowledge of the employees and students, the research and development process within the universities can accomplish new groundbreaking results.

1.1   Background

LUAS has about 400 employees and the majority (250) of them are teachers. There are nearly 5300 students in the University. LUAS is a part of the Federation of Universities of Applied Sciences (FUAS) alliance with Hämeenlinna University of Applied Sciences, Laurea University of Applied Sciences and Metropolia University of Applied Sciences. (LUAS 2014)

The Lahti University of Applied Sciences (LUAS) has changed its organizational structure to Public Limited Company. The new company was established on the 1st of January, 2015. (LUAS 2014) The aim is to create more flexible organizational structure and decision-making processes. The ownership of the university remains still in the public sector. The owners are the municipalities and cities of the area. (Etelä-Suomen Sanomat 2013) The biggest owner of the university is the city of Lahti, who owns a 56 per cent share of the company (Kivelä 2014).

There are six faculties in Lahti UAS: Faculty of Business Studies, Faculty of Tourism and Hospitality, Institute of Design and Fine Arts, Institute of Music and Drama, Faculty of Social and Health Care and Faculty of Technology. Lahti UAS aims to provide high-class education and teaching to their students. The teaching methods are innovative and the institute offers skills to their students that are required in work life. (LUAS 2015a)

1.2   Digitalization

Digitalization is defined as changing the existing processes, renewing the ways of working and offering digital services. The user is the center of the whole process. Digitalization is part of the Finnish government's strategy. (The Ministry of Finance 2015) The digital strategy will influence the education in elementary schools, but the digital learning environments should be part of higher education too (Confederation of Finnish industries 2015).

"Digital literacy -Use, Understand and Create" (Canada's centre for digital media and literacy 2015).

Digital literacy is an important skill in a digitalized world. According to Canada's center for digital media and literacy, digital literacy consists of three elements: to use, understand and create. The user has to have technical fluency, which consists of applying technical knowhow in using technology. The user has the skills to navigate and access as well as use different tools. The user has to understand and evaluate the information in the web like the ethics, responsibilities, copyrights and making decisions. The user has to produce content and select from different communication tools. The user can create new innovations, work constructively, socially and think critically. (Canada's centre for digital media and literacy 2015)

The digital competencies in higher education can be represented in the so called six elements of digital capabilities. These competencies consist of: ICT proficiency and fluency, information, media and data literacy, creating and innovating, digital research and scholarship, E-learning and professional development, communication, collaborating and participating as well digital identity and well-being. (Beetham 2015) Figure 1 summarizes the skills of digital literacy and well-being:

Digital identity and wellbeing

ICT fluency (tools and technology)

Data, information and media literacies

Digital self-development

Communication, networking and participating

Digital innovation and creation
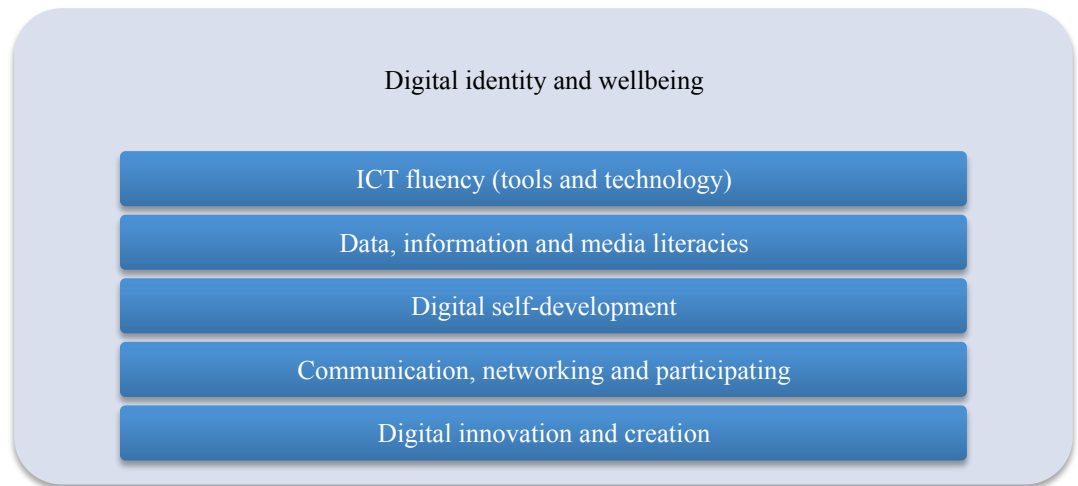
Figure 1.The digital literacy (Canada's centre for digital media and literacy 2015; Beetham 2015)

If digitalization will be part of education, it requires transformation from the whole educational system. When technology is properly integrated to the learning processes, the learning environment will change and motivate students better. Technology might be difficult to involve for different faculties. Technology can also be integrated into the teaching gradually and after this become a practice. Digitalization can lead to creation of new innovative learning environments. (Groff 2013)

Digitalization and digital literacy are identified also in LUAS. The vision of Lahti University of Applied Sciences is to be "Insightful, experimental and exploring Lahti UAS 2020 - The International builder of future learning and prime mover of regional growth". The aim is to respond to the changes in operational environment like digitalization and robotization. It is also crucial to understand competition in higher education. The development of Lahti region, glocalization and changes in teaching and education need to be taken into account. The aim is also to understand the changes in economy and strive for resource effectiveness. The values are: joy of exploring together, insightful learning experiences and valuable work, expertise and success. Cooperation at regional and international level, the professional development of students and to offer expertise to industry are the main parts of strategy. The mission is to reinforce the partnerships and brand the

company image. Regional development is cherished. The student and learning are the main purpose and the well-being of the staff is important. (LUAS 2015b)

The strategy has four focus areas. These are design, smart industry, welfare and regenerative growth and clean and dynamic environment. These areas are described in Table 1:

Table 1. Strategic focus areas of LUAS (LUAS 2015c)

Focus area	Description
Design	User-centric solutions
Smart industry	Creating new products, services and business ideas with digital applications, cost-efficiency
Well-being and regenerative growth	Health, competencies and participation of employees
Clean and dynamic environment	Clean tech and sustainability

The operation modes of the organization supports experimental learning, transformative learning and entrepreneurship. Cooperation, critical thinking, continuous learning, innovativeness and providing research and development services to Lahti region are important. (LUAS 2015b)

The whole organization and the stakeholders are participating in developing the strategy. The opinions of students are also taken into account. The strategy is developed by web-based survey and within project groups. The strategy is one part of the quality system. (Fränti 2014) The last external audit was performed in 2007 and the next international audit is scheduled for 2016. The strategy is constantly updated and the internal and external audits are made to supplement the processes. (LUAS 2015c).

The funding of the universities is based on education 85 %, research and development 15 % and strategic funding 2, 5 %. These three dimensions are categorized into: regional development & cooperation with local companies and

quality & internationalization. Feedback from students, the graduated workforce, innovativeness, published materials and technical applications are some of the performance indicators. Nevertheless, the main part of the funding is based on the graduated students (46 %) and the number of students who complete 55 credits (26 %). (Ministry of Education and Culture 2015)

1.3   Future competence challenges of teachers

Lately, there has been lot of discussion about the digital competencies of teachers in different media. For instance, according to YLE news (2015b), report on New Media Consurtium in 2014 and the European Union survey in 2013, the digital competence development of teachers is falling behind the needs of students and society.

The research by the European Union in 2013 showed that teachers should be offered more time to develop their professional skills in the field of technology and the ICT infrastructure needs to be updated. According to the European Union report 2013, Finnish teachers prefer more traditional teaching methods like lectures and they do not use ICT in planning their lessons. Teachers are not using their spare time to develop their ICT skills and they are expecting training from their organizations. The EU survey proposed that students should be offered more technological education to increase the competitiveness. (European Commission 2013) Competitiveness was also highlighted in the NMC Horizon report 2015 and the universities should pay attention to the rewarding of the teachers. The other challenges will be offering personalized learning and teaching the students to think in a complex way. Technical trends, for example Bring your own devices (BYOD), flipped classroom and the Internet of things are also bringing their own challenges to learning. (New Media Consortium 2015).

An OECD study about innovative learning environments in 2013 stressed the facts, that the barriers to the university change process towards innovative learning environments are usually the conservatism and the bureaucracy in the universities. Rules and regulations need to be followed. With the help of knowledge and information creation, along with correct technology, rewarding and competence building, increasing social capital, the change can be

accomplished. (OECD 2013). Based on the NMC 2014 report, the role of students is changing from consumers to the innovators and the students require more personalized learning.

The universities should find their ways to attract skilled workforce that have abilities to use ICT technology, because the universities are competing for employees with the public sector (Trow 2002, 309-311). The employees and the students will become more mobile and they can seek new experiences (Urry 2002, 23-29.) The workforce should also be motivated to develop their professional skills by rewarding and developing adequate human resource policy. (Trow 2002, 309-311.) The universities will have to change their processes to a more measurable form in order to be compared with other universities outside the national borders (Urry 2002, 23-29). The competitiveness of universities of applied sciences compared to universities should be increased. The financing from the government will decrease in the future and the universities have to find ways to find alternative ways to finance their operations. (YLE 2015c)

Traditional teaching is changing towards team working. The teachers are concentrating more on specialized tasks like course design, planning the assignments and materials, creating audio and video files, helping and guiding the students, cooperating with different networks and developing processes. The teachers have to identify how to use different media in designing the classes. The teachers are required to communicate with students with the help of technology. (Panda 2004, 78-80.) The teacher requires understanding of different devices and software, as the BYOD-model will become more popular among the universities (EDU 2013).

The global economy can influence the operational environment of the universities. Trade unions, the European Union, the government and other countries may set certain standards and laws to education. (Urry 2002, 23-29.) The teachers of the university may be working only as part-time lecturers or scientists in the university and their main work can be located elsewhere (Trow 2002, 305-309).

Teachers will become more like directors or mentors for their students. The personal needs of the learners will be taken more into account. (Ahonen, Joyce,

Leino & Turunen 2003, 37.) For instance, students with learning disabilities can be supported (Cumming 2014, 132-133). The students from different countries and part-time students from work-life may also require more mentoring than full time-students (Bates & Sangra 2011, 3-7). There are also students from different age groups and income-levels. The younger generations may have more experience with technology than the older students. People with lower income tend not to continue their studies on polytechnics or universities after vocational school. Higher education and new learning methods are required in the areas where the population is growing rapidly and the spaces of old universities are getting too small for huge masses of students. (Trow 2002, 311-313.) Technology may reduce the equality of the students, because not all of the students may be able to afford, for instance, mobile devices (YLE 2015a). The quality of teaching must be the same for everyone and the curriculum should be suitable for everyone. Understanding diversity and motivational factors influencing student's ability to learn will be one of the core competencies of teachers in the future. (Bates & Sangra 2011, 3-7.)

It is important to know where to find information and how to create knowledge. (Bates & Sangra 2011, 10) The teacher is required to know how to utilize differentiated learning environments (Ruohotie 2000, 39). The students need to learn problem-solving, entrepreneurial and innovation skills in order to work in knowledge work occupations (Bates & Sangra 2011, 9-11).

There is more variety in creating the curriculum and course materials with the help of technology. However, teachers need to help the students to think critically and evaluate what information is relevant and professional (Bates & Sangra 2011, 48-50). One problem can be plagiarism because the information can be easily copied or borrowed from different information sources. School certificates can also be forged in order to get better workplace. (Trow 2002, 305-309.) That is, the teacher requires the ability to identify copyright issues and plagiarism. The privacy and security issues have to be taken into consideration separately. (Bates & Sangra 2011, 27-29.)

Teachers have to have good research and development skills. Teachers will have more differentiated tasks to perform. In addition, they have to be dedicated to their

job in order to prepare the courses properly. The preparation of virtual classes takes more time than the conventional courses due to the design of the online course materials, assignments and the aim of the course. The staff can be specialized into different tasks, but their personal development and goals should be taken into account. (Panda 2004, 86-91.) It is important to set standards for working conditions and terms, because the teacher's working time will become more flexible (Davis, Little & Stewart 2008).

Technology can cause isolation and decrease the normal interaction and discussion between teachers and students (Kanuka 2008). Technology can also bring health risks that are not yet acknowledged or widely investigated. The electro-magnetic radiation is all around us, because technology exists everywhere. It can cause health problems like cancer. Working with laptops also causes problems if the ergonomics is not properly considered. The learners must take breaks every now and then in order to accelerate the blood circulation by moving. Exercising is natural to human beings so the moving should be encouraged. (Hänninen, Huttunen, Ekman & Koskelo 2011, 97-102.) The teacher role is to identify these problems and understand the balance of digital learning and more traditional learning.

The evaluation of the digital skills of students will be crucial. Teachers need to support digital literacy with different study methods. (Bates & Sangra 2011, 20-21.) The teacher has to select the correct learning environment (Hamm, Drysdale & Moore 2014, 3-5). The new technology enabled course structures will lead to the improved quality of teaching and reduced costs (Bates & Sangra 2011, 3-7). The teacher is required to have the ability to understand the cost-effectiveness of the teaching process (Perraton 2004, 141-145).

Teachers have to be cooperative and to share different ideas by socialization, different communities and networks (Koponen 2008, 208-213). Networking, especially with those organizations that have already utilized technology, helps the other organizations to imitate good practices (Cornford & Pollock 2002, 91-92). The communication will help teachers to assess critically information and create new ideas (Koponen 2008, 211; Loveless et al. 2001, 70-72).

When it comes to the ICT skills of the teachers, they have to develop their pedagogical content skills. This means the skills of how the teachers can combine their knowledge and skills when teaching with ICT to different kinds of learner groups. It has to be kept in mind that there are teachers from different age groups and backgrounds. They may also have different kinds of motivation and interests to developing their ICT skills. ICT can help the teachers to improve their professional awareness if they have positive attitude towards ICT development. (Loveless, DeVoogd & Bohlin 2001, 70-72.) However, the academic freedom and autonomy of teachers should not be limited (Trow 2002, 309-311).

Training improves the self-confidence of teachers towards new technology, like Nieminen & Mannonen propose (2007, 178-181). The negative attitudes to new technologies can be also changed by increasing awareness about different technical solutions that can help in teaching (Kotter & Whitehead 2010, 182-190; OECD 2013; European Commission 2013). When the proper technology is selected for pedagogic purposes carefully and utilizing the expertise of teachers (Pacansky-Brock 2013, 53-58.), the quality of teaching will be improved (Bates & Sangra 2011, 3-7). The competencies of employees should be mapped regularly in order to see what skills are lacking (Sydänmaalakka 2009, 211-220).

Along with the trends, the teachers require continuous development of themselves. The different trends influence on the competence requirements of the teachers. The future skills of the teachers are summarized in Figure 2, where the customers are defined as regional companies and students. The technology is changed into digitalization. The other two areas are economic and learning and growth sections.

Economic
- Cost-efficiency
- Performance improvement
- Resource allocation

Students & Regional companies
- Mentoring
- Diversity (culture, economic, background, age)
- Digital literacy
- Personal development
- Research & Development
- Entrepreunership
- Personalized learning
- Cooperation
- Communication
- Mobility
- Knowledge work (entrepreunership, proble-solving, innovation, communication, information finding)

Digitalization
- Ethics
- Privacy & Copyright
- Create and edit digital material
- Evaluate student performance in digital learning environments
- Find and use different learning tools
- E-learning & Mobile learning
- Use classroom technolgies
- Select learning environment
- Digital literacy
- Communication
- Flexibility
- ICT & Pedagogic content
- Teaching
- Designing curriculum
- Personalized learning

Learning and growth
- Professional communities and networks
- Training
- Increase commitment
- Rewarding
- Motivation
- Continuous learning
- Mobility
- Quality assurance

Figure 2. Future competence requirements of teachers

As a response to the changes in society, LUAS has launched the Niemi Campus project and developed a new strategy to support new teaching technologies. The Niemi Campus aims to build a center for innovativeness in Lahti region where the university should locate and cooperate with local companies. The companies of Lahti area could utilize the research services of the university. Future learning environments like mobile and online learning should be the main parts of the education. (Hyökki, Kaikonen & Nenonen 2013) The new campus would mean closer cooperation with students and companies in the region, reduce the costs, combine the working spaces between the education units and also offer new kinds of possibilities for learning. Nowadays, the faculties of LUAS are not located in the same place. In the new campus, the faculties, teachers, students and

administration would cooperate better. (Salakka 2013) Some faculties have already transferred to Niemi campus and these are the degree programmes in environmental technology and business (Niemi Campusinfo 2020). The competence development of teachers is also accounted for in the human resource department in order to cover the changing requirements of the teachers (Fränti 2014).

1.4   Research questions, methodology and objective of the thesis

The research questions that are covered are:

> *RQ1: What are the key factors influencing on individual's digital competence development?*
>
> *RQ2: What are the main challenges the LUAS teachers are facing in their digital competence development?*
>
> *RQ3: How should the digital skills of the teachers be developed in order to improve the quality of education in LUAS?*

The objectives of this thesis are:

- ➢ To map the current situation and existing barriers
- ➢ To create a blueprint of how the digital skills of the teachers should be developed in order to improve the quality of teaching
- ➢ To increase the importance and knowledge of digital competence development

The target group in the study is the LUAS teachers. The reason for selecting the teachers for the study is the current debate in society about their digital competencies. Teachers also represent the majority of the employees in LUAS. Students are not included on the target group, but the interaction between the students and teachers should not be disregarded. The attitudes of the students in digitalization are strongly influencing the competencies of teachers. The self-evaluation of own level of competencies also affects on the process. The stability of the needs between the teachers and students, self-orientation, existing skills and interpretation of own skills require clarification.

The main concepts of this thesis are digitalization, continuous learning, teaching, and competence development. The main scope of this thesis is the whole LUAS, but the research recommendations can be used also in other universities of applied sciences. The intent of this thesis is that it can be modified to the purposes of every organization that faces challenges in the digital competence development of their employees. The organizational learning, digital competence development and preparation for future trends are considered in each organization.

1.5 Theoretical framework and limitations

The formulation of the research problem was not easy, because the researcher is not an employee of the LUAS organization and it was difficult to get access to the data. The process of creating the research problem consisted of the following stages: discussing with several employees of LUAS organization, getting to know the research related to educational technologies, reviewing the theories of education and digitalization, investigating the theories of competence development and strategy and conducting open interviews. By using the existing literature like reports and articles related to technology and education, the expectations connected to the teacher competencies were distinguished. The process is described in Figure 3:
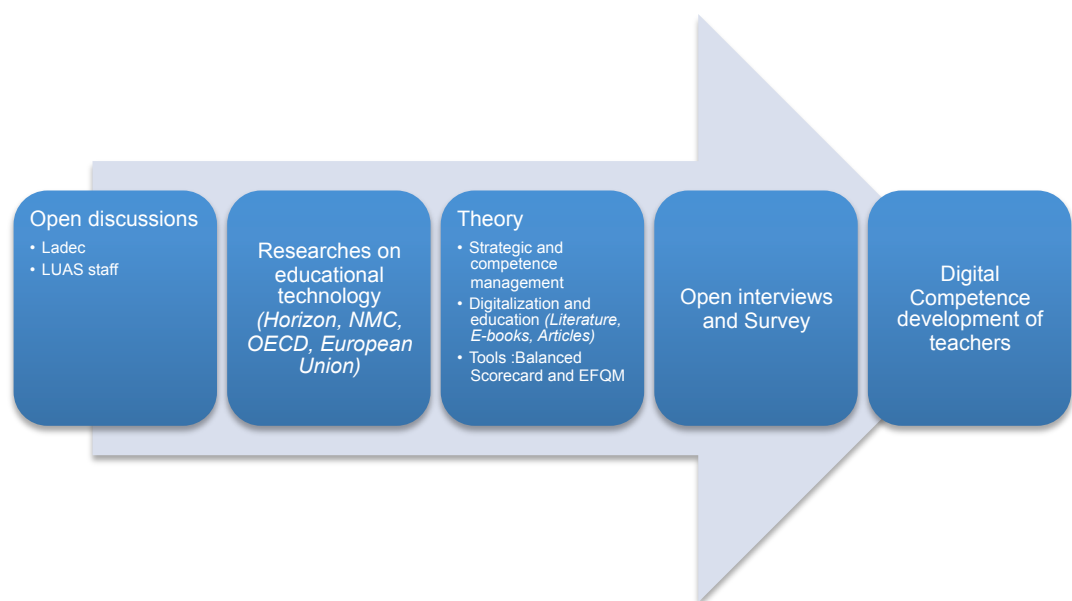
Figure 3. Process of formulating the research problem

The limitation of the study is done by excluding different trends influencing education and concentrating only on digital competence development. The mapping of existing competencies were left out due to the time limit of the researcher. The different learning environments and tools connected to digitalization were excluded. The study examines only the competencies of the teachers and the students are not involved.

1.6   Structure

This chapter demonstrates the progress and contents of the Master thesis. The introduction explains why the study has been made, what has been investigated and how the process has been performed. The second chapter concentrates on the literature on competence development. In chapter three, the research context and data collection methods are introduced. The fourth chapter concentrates on the recommendations based on the research findings. In the last chapter, the conclusions based on the research findings, objectives and research questions are represented. Figure 4 describes the thesis structure:

Chapter 1	• Purpose, objective, literature, tools, contents • Why, what and how
Chapter 2	• Theoretical part • Competence development,change process, learning theories
Chapter 3	• Empirical research context and methods • Explain how the empirical data was gathered
Chapter 4	• Research findings and recommendations • Competence development factors, quality of teaching,challenges, development ideas
Chapter 5	• Conclusions • Summarizing the research questions

Figure 4. The Master's thesis structure

2 LITERATURE REVIEW

2.1 Competence development

The organization must have shared goal and vision that steers the company actions

(Senge 1990, 9)

The strategy is the intention of an organization's actions (Nonaka & Takeuchi 1995, 74-80). Strategy is a defined a plan that leads to desired result and will give competitive advantage to the company. The company can have internal or external strategy. The strategy helps the company understand its operational environment. (Puolamäki & Ruusunen 2009, 16-19.) The individuals can formulate their own vision from his or her values and objectives. The individual's own vision effects on the common vision and individual's professional growth. The shared vision and values help people to work together towards a common goal and provides good prerequisites for learning. The commitment, motivation and energy of people will increase if they have a clear goal to be accomplished. The organization has to define why and how the vision can be achieved. (Senge 1990, 205-224.) (See Figure 5).
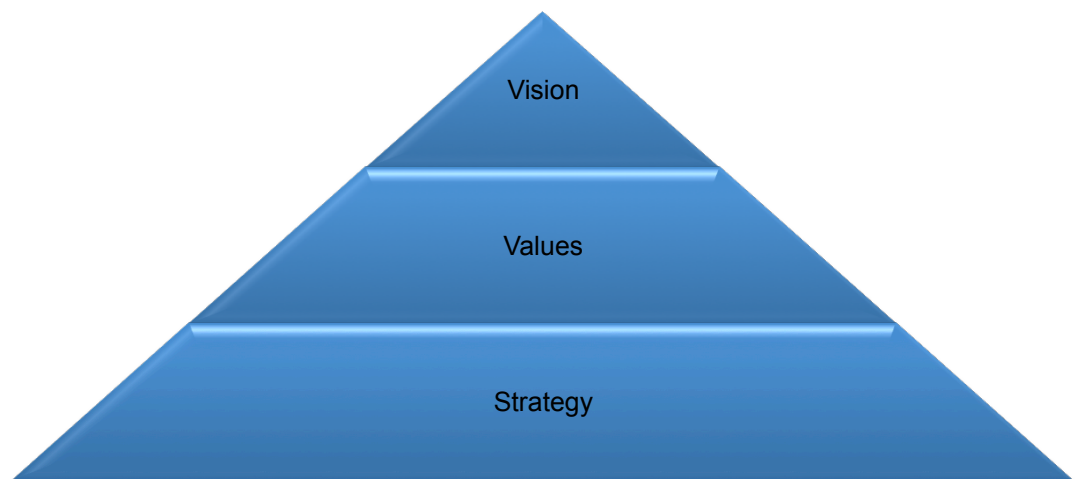
Figure 5. The strategic framework (Senge 1990, 205-224)

The strategy helps to anticipate the changes of the environment by creating new scenarios, finding new opportunities, preparing for future threats and supporting organizational learning. The innovation values should be part of the organizational culture and the values encourage openness, creativity, and trust. The mistakes can be seen as a learning opportunity. The organizational structure must be flexible and non-bureaucratic. (Sydänmaalakka 2009, 211-220.) By being flexible, the organization can respond to future changes with evolving knowledge and competencies. The knowledge must be utilized in all the core processes, services and products of organization. The flexibility means that organization can locate everywhere. The employees of this kind of organization are motivated. The core competencies of the company cannot be outsourced. (Ruohotie 2000, 257-261.) Innovativeness should be the core competence of a company (Sydänmaalakka 2009, 211-220). The resource-based view is usually discussed in connection with HRM (Purcell 2005).

The innovation process should be clear and the responsibility of every employee within the organization. Innovativeness should be managed at organizational, team and individual level. At the organizational level, the vision, values and strategy direct the actions of the management. The organizational resources effect the innovativeness, because money, time, technology and the learning capacity of employees determine the innovation potential. (Sydänmaalakka 2009, 200-222.) The management should give enough autonomy to the employees to act independently (Nonaka & Takeuchi 1995, 74-80). Self-orientation and the diversity of people should be also appreciated. The innovation process should be measured so that the effectiveness of the process can be evaluated for instance by calculating the amount of new ideas and evaluating the amount of the resources used during the process. The management should understand the term virtual management when managing virtual teams, spaces, technologies and people from scattered locations. The network of the teams and individuals need to be also managed, utilized and created systematically. (Sydänmaalakka 2009, 200-222.)

According to the Kaplan and Norton (2002, 234-297.) the following aspects have to be taken into account in order to increase the employees' awareness and motivation towards strategy:

- Communication and training
- Setting personal and team goals
- Rewarding.

Communication has to be done systematically. The strategy needs to be familiarized by increasing awareness to the employees by training and creating supporting and open atmosphere to strategic development. The awareness can be increased by using several communication channels like brochures, intranet and organizing regular meetings, using strategy maps for illustrating the organizational goals and creating effective feedback systems. It is also important to set personal goals for the employees. The employees can follow their personal development and how their efforts are affecting to the strategy development. (Kaplan & Norton 2002, 234-297.)

The reward systems and salaries can also be connected to **the Balanced scorecard**- model. The progress of the teams and individuals can be followed based on the strategy map. (Kaplan & Norton 2002, 234-297) The Balanced Scorecard- model helps the companies to define the objectives of company's vision and strategy with the help of performance indicators. The business performance can be defined with four perspectives that are related to customer, financial, the business processes and the strategic human and technological resources. These perspectives can be visualized on Figure 6. With the help of defining these factors, the company can clarify its vision and strategy but also increase the cooperation within the organization. It is also important to show the results of the performance indicators and how they effect to different processes. The competitor analysis should be integrated to this process and the HR department can create a map for managerial competence requirements. (Boxall & Purcell 2003, 235-246.)
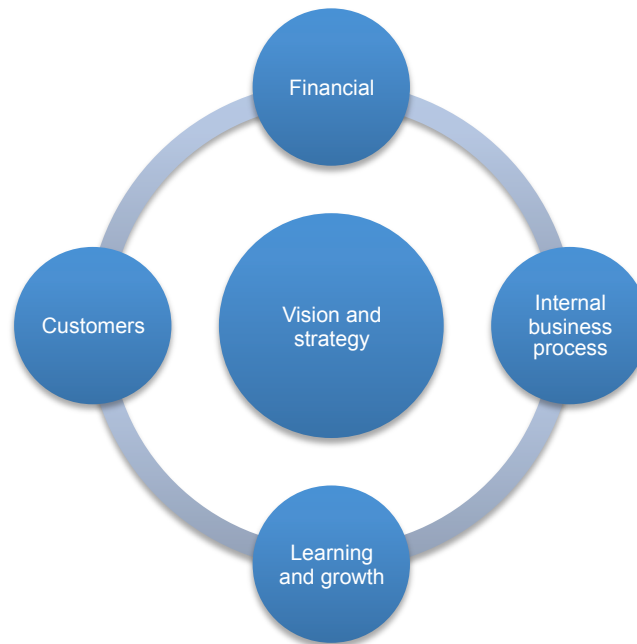
Figure 6. The Balanced Scorecard (Kaplan & Norton 1996)

The Balanced Scorecard helps the company to define the intangible and tangible capital in concrete values and to create a strategic map. The intangible values are technology and knowledge. The vision and core values of the company work as a base to the Balanced Scorecard- model. The financial aspect concentrates on creating the growth based on existing customers, increasing the performance of the processes and measuring the cost structure. The organization strives for creating value to its shareholders. The purpose is to increase the revenue of the company by growth and productivity. The strategy can be defined from the viewpoint of the customers. The organization can segment the most important customer groups and meet their needs. The organization cherishes these customer relationships by creating additional value to their key customers. The company can also aim to excellence in their processes or to be market leader on their field of business. (Kaplan & Norton 2002, 74-107.)

The strategic vision helps the company to define its values according to costs, product innovations, quality, process cycles, supplier chain effectiveness, process development and societal and environmental factors. The learning and growth of employees helps to define the strategic competencies of the company. It also helps

to create the technology and the environment that promotes development of the organizational culture. (Kaplan & Norton 2002, 74-107.)

The rewarding of the employees can be extrinsic or intrinsic. The extrinsic rewarding is connected to money and other measurable benefits. The extrinsic rewarding is closely bound to following rules and processes. Nowadays, the employees are more self-managed, so the extrinsic rewards are not necessary required for work satisfaction and commitment. Intrinsic rewards are connected to the work results. (Thomas 2000, 6-7.)

The knowledge and the competencies of people are seen as resources that are strategic and help companies to increase their competitiveness. Individuals and organizations have to adapt to the changing environment by continuous development and innovations. (Nonaka & Takeuchi 1995, 43-50.) The role of human resource management is to concentrate on managing strategic long-term objectives and short-term operational goals. By managing people and processes, the HRM helps to manage the strategic human resources, the basic structures of the company, increasing the commitment and support the employees and managing changes. (Ulrich 2007, 47.) The knowledge of the employees is managed via effective hiring process, on-the work training and education (Ruohotie 2000, 22).

> *The core of the organizational knowledge-creation process takes place at the group level, but the organization provides the necessary enabling conditions.*

> (Nonaka & Takeuchi 1995, 225)

The competencies of the employees should be measured and the training should be organized according to the lacking competencies. There should be several communication networks and channels to share the information. With the help of technology, new ideas to innovations could be compiled from the customers, suppliers, competitors, shareholders and employees. (Sydänmaalakka 2009, 211-220.)

Teamwork is supported by reward systems. Communication and feedback systems have to be designed to support the continuous improvement of processes. The skills to adapt and change are seen as a key to success. Leading an intelligent organization requires visionary management skills that is foreseeing and also creating enthusiastic spirit within organization. The company could also hire so called innovation coaches to encourage innovativeness. Visionary leader respects the values of the organization and is emotionally intelligent. The employees can participate on constant development of the strategy and this helps the understanding of the strategy. (Sydänmaalakka 2002a, 168-220.)

The employees need to feel they are appreciated and their opinions are valued. The employees can participate on making decisions and developing the organization. The line management is responsible for commitment of employees. The requirements towards the employees are growing all the time. The employees can feel that their resources are not enough to fulfill these requirements. This can lead to burn outs and the employees may feel they are insufficient to perform their tasks. (Ulrich 2007, 159-164)

In order to avoid burn outs, the requirements towards the employees should be prioritized and evaluated, for instance, by defining what are important processes and whether they are necessary in creating competitive advantage for the organization. After decreasing the bureaucracy and simplifying complicated processes, the employees have more time for tasks that will increase their commitment. (Ulrich 2007, 166-169.) Ulrich (2007, 170) also claims that the different development projects should be combined under specific themes, so that the employees do not become confused about organization having several development projects on the same time.

Senge (1990) has defined the so-called **five disciplines** that help organizations to increase innovativeness and learning. These disciplines are: systems thinking, personal mastery, mental models, common vision and team learning. These five disciplines increase organizational learning and they are illustrated on Figure 7. (Senge 1990, 5-13.) The disciplines are examined next more closely.
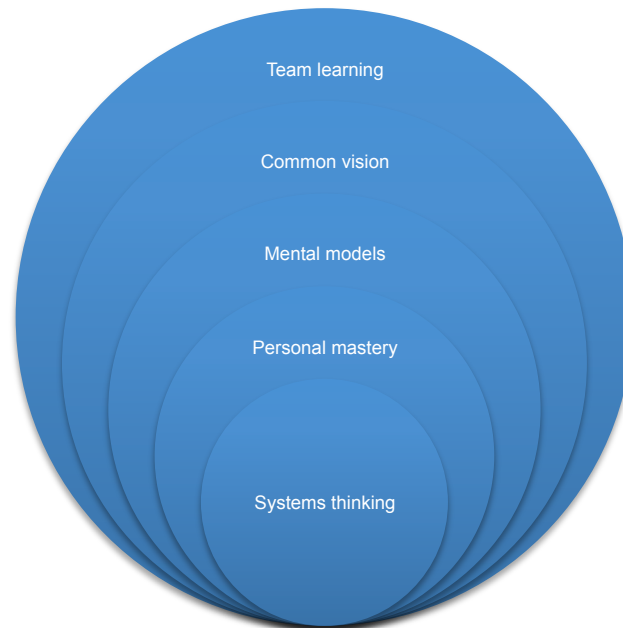
Figure 7. The five disciplines of organizational learning (Senge 1990. 5-13)

It is essential to identify the interrelationship of these five disciplines in order to influence and change them effectively. The employees within the organization have to develop their personal skills in order to achieve the level of professionalism that is called personal mastery. By building the employees' competencies and increasing their motivation, the employees can help the company to change. (Senge 1990, 7-8.) The employees have to gain the personal mastery via desire to continuous learning. The employees have to have their own future vision how they wish to develop their skills and professional growth. (Senge 1990, 142-150.)

People think according to certain patterna that have been formulated during their live. Employees should have the ability to change their mental models and become more receptive to new ideas. Openness and curiosity towards new things is required in order to increase innovativeness. (Senge 1990, 8-9.) Encouraging employees to think more critically can change their mental models. Increasing communication and objectiveness within the organization, the mental models can be changed. The development of mental models becomes easier if we rehearse the reflection skills and understand the reasons behind our ways of action. The

awareness of our own ways of thinking is essential in order to reflect and interact with others. (Senge 1990, 174-204.)

Companies must also emphasize the importance of teams and increase the communication between them. Groups of individuals can be a great resource as they can create new transformative ideas through cooperation. (Senge 1990, 9-11.) Organizational learning is supported with well-managed and organized teams that combine their forces in order to get a comprehensive view about a problem. The team members have to have clear roles and defined tasks. The open dialogue helps people to develop their own way of thinking, exploit each other's resources, share different opinions and settle conflicts. The open dialogue helps to discuss about matters on constructive way. (Senge 1990, 233-269.) The dialogue also promotes the creativeness of a team and helps the team to reorganize and develop their working processes (Sydänmaalakka 2009, 196-197).

By systems thinking, all of the processes are combined and their influences on each other are understood (Senge 1990, 12-13). Systems thinking is actually explained by seeing interrelationships and processes of change that are happening regularly. It is like an overall picture of the entity. In order to understand the wholes, it is important to gather feedback. The feedback reflects what has happened and tries to find the reasons behind the activities. The feedback helps to gather information to develop the organizational performance. The feedback must be both positive and negative in order to be effective and offers organization possibility to learn from their mistakes. With the feedback, the company can develop their actions. (Senge 1990. 73-83.)

The organization must create the knowledge and also share it in order to succeed.

> *Knowledge is a dynamic human process of justifying personal belief or truth*

> (Nonaka, Konno & Toyama 2001, 14)

Nonaka and Takeuchi (1995, 62) state that new knowledge is created by **knowledge conversation** in interaction between the employees. The knowledge conversation happens in four ways: socialization, externalization, internalization

and combination. The knowledge can be explicit or tacit. Explicit knowledge can be described in written form, like numbers and words. Tacit knowledge is hard to define in words and it is personal expertise to handle different tasks with own intuition. (Nonaka, Konno & Toyama 2001, 14.) The Table 2 describes the knowledge conversation process that is performed by sharing tacit and explicit knowledge. (Nonaka & Takeuchi 1996, 62-63.)

Table 2. Knowledge creation process (Nonaka & Takeuchi 1995, 62)

	Tacit knowledge	**Explicit knowledge**
Tacit knowledge	Socialization	Externalization
Explicit knowledge	Internalization	Combination

Socialization is a process of creating tacit knowledge by sharing experiences and adopting tacit knowledge from other employee. Socialization happens by following the actions of colleagues or learning technical skills. The individual can effect on the assimilation of the knowledge by his or her own thinking process. (Nonaka & Takeuchi 1996, 62-63.)

In externalization, the tacit knowledge is transformed into explicit meaning. The tacit knowledge is changed into concepts, models or other expressions. The concepts may be hard to define. Using metaphors helps to familiarize the tacit knowledge into explicit form and to deepen the understanding. When concepts of externalization are created, the knowledge existing can shared and **combined.** The knowledge sharing happens in meetings, computer networks and other communication tools. The new knowledge can be created by modifying the existing knowledge for instance by offering training for employees or attending education offered by schools. The middle managers have to make the organization's vision understandable to the employees and to modify the externalized concepts into practical form. (Nonaka & Takeuchi 1995, 64-69.)

In internalization, the explicit knowledge is transformed into tacit knowledge. The explicit knowledge can be transformed into written form and this helps individuals to internalize and conceptualize the information. The internalization

can be happened through learning by doing and it can deepen the individual's expertise. (Nonaka & Takeuchi 1995, 69-70.)

The process of sharing knowledge is described as **knowledge spiral**. Sharing knowledge creates new innovations as tacit and explicit knowledge interact with each other. Knowledge creation can happen at an individual, group or organizational level. It can also expand outside the organizational boundaries. It is important to share experiences and mental models by socialization. Secondly, the knowledge is reflected and concepts are articulated in the process of externalization in dialogue with the group members. Thirdly, the new and existing knowledge is networked and shared within the organization. This helps to conceptualize the new innovations. Last, the internalization happens when the employees learn new things while processing the explicit knowledge. The internalization is also called as operational knowledge or learning by doing. (Nonaka & Takeuchi 1995, 70-73.) The process of knowledge spiral can be seen on the Figure 8:

Externalization   Socialization

Combination   Internalization
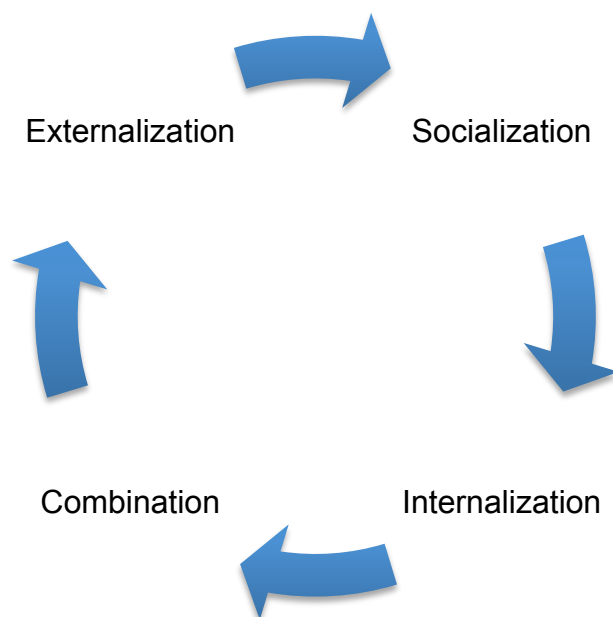
Figure 8. The knowledge spiral (Nonaka & Takeuchi 1995, 70-73)

2.2   Tools for analyzing quality and change forces

When creating effective HR strategy, the external trends influencing the operational environment have to be evaluated. The evaluation of trends help in understanding and defining the resources of competitive advantage and what kind of organizational culture that is required for the change. The competitive advantage can be in connection with the quality, innovation, cost, branding etc. The desired organizational culture has to be defined in order to improve the performance in the sense of competitive advantage. (Ulrich & Brockbank 2005, 149-165.) Next, some tools for developing quality and operational environment are explained in order to cover the research objectives.

EFQM

The European Foundation of Quality Management was founded in 1989. The aim was to improve the competitiveness of European companies. The other objective is to promote sustainable development. Any organization can benefit from EFQM-model, because the concepts of the model are holistic. EFQM-model is used to improve the quality with sustainable development. It helps to find the ways to achieve success. (EFQM)

The EFQM-model enables continuous learning and innovation as well as evalution of the organizational processes. The EFQM-model is divided into three concepts which are:

- The Fundamental Concepts of Excellence
- The Model Criteria
- The RADAR Logic. (EFQM)

The Fundamental Concepts of Excellence suggest that every organization can achieve success. It is based on eight concepts that describe excellent organizational culture. (EFQM 2012a) These concepts are listed in the following Figure 9:
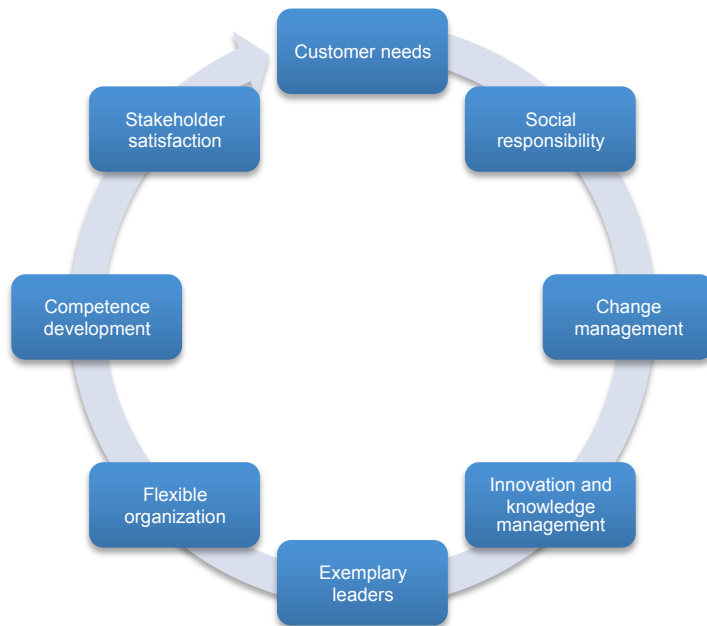
Figure 9. Fundamental concepts of excellence (EFQM 2012a)

The company can achieve success if it will give added value to their customers. The organization must constantly fulfill the needs of the customers. The organizations should also participate in creating sustainable future, which means that the organizations have responsibility to improve the quality of economic, environmental and social situation. The organizations are prepared to manage change inside the company and also outside the company. They are developing their processes to adapt to the changing conditions in the market. The company should also inspire their employees to develop their skills and to create new innovations. The leader of the organization must act as an example to the employees. The great leaders can adjust to the future changes and modify the future to look brighter to their organizations. The leader is encouraging the employees to achieve common goal. The organization must be also flexible. The companies are prepared to manage the opportunities and threats, when they can adapt to new market situations. The competence development is part of the organizational culture. The stakeholder needs are listened and respected. (EFQM 2012a)

The organization can gain the desired results via enablers that are: Leadership, People, Strategy, Partnership and Resources. The desired outcome is attained in

the form of Employees, Customers, Society and Business. Within the organization, continuous process of innovation, learning and creativity is encouraged. This process is called **model criteria.** (EFQM 2012b)

The radar logic will help the managers to assess the organizational performance in a structured way. The radar logic also helps to understand the performance indicators and the strategic approach, for instance the trends, performance, causes, the targets, segmentation, scope. The organization has to also understand the objective of its actions and define the desired results. The organization has to define how it is going to achieve the desired objective. It is also important to plan how the goal will be achieved. The planned approached must be implemented in practice. The process has to be evaluated and gather feedback. The process must be monitored and developed in the future. (EFQM 2012c) The radar logic is described in the Figure 10:

Radar Logic
• Objective
• Planning
• Implementation
• Assessment

Figure 10. Radar logic (EFQM 2012c)

In the next chapter, the strategic change process is discussed in order to understand the connection with the human resource management.

2.3   Strategic change process

As mentioned earlier, human resource management and company competitiveness are closely bound to the company's ability to change and respond to future

changes. Organizational change can influence the core operations of an organization such as technology, structure, employees and the management. The changes can be small or alter the whole organization and have positive as well negative implications to the organization. (Mills, Dye & Mills 2009, 4-9.) In the change process, the purpose is to develop something. The aim is to create something new related to the old ways of working. (Russell-Jones 1995, 10-16.)

According Nonaka & Takeuchi (1995, 43-50), Ruohotie (2000, 257-261) and Sydänmaalakka (2009, 211-220), the organization has to be flexible in order to prepare for future changes and create innovations and knowledge. The actions of competitors, behavior on consumers, changes in technology, legislation and authorities and prices have to be taken into account. The change process is successful if it takes into account the organizational culture, people, structures, strategy, processes or systems. The change needs to be systematic and requires patience. It is good to have a clear plan how to proceed. (Russell-Jones 1995, 10-42.)

Russel-Jones (1995, 74-81) emphasizes the following stages before starting a change process: analysis, drafting, planning and implementation. The Figure 11 shows the stages of starting the change process:

Figure 11. Creation of change plan (Russel-Jones 1995, 74-81)

In the **analysis** phase, the organizational culture, the characteristics of the change, structures, strategy, leadership and environmental factors need to be evaluated. The analysis of the current situation makes the change process easier to accomplish. In **drafting** phase, the change plan is created. The plan includes creation of the change vision and selecting the change team that can promote the

change vision and communicate it to the other employees. In the **planning** stage, the change is thoroughly planned and the future risks are also considered. On this stage, the resources are planned. The change is scheduled and the change consequences are analyzed. The change process needs to be communicated in the company in order to create cooperative spirit among the employees. When the plan has been created, it should be **implemented**. The plan needs to be followed regularly, but the changes in the environment and strategy need to be taken into consideration. The quality of process needs to be supervised. (Russel-Jones 1995, 74-81.)

John Kotter (2010) has created a 8-step process for leading change. The need for change needs to be identified It is important to create a group that will lead the change process. These people are able to cooperate between the different departments of the organization and they have leadership skills. These people have high trust in the change process. The change team will create the clear vision of the change and will set the strategic goals to achieve that vision. The vision has to be communicated clearly to the people that are connected to the change process. The management must give their support to the change process team, because they can remove the barriers of change like the lack of training, skills of the employees and ICT systems. (Kotter & Whitehead 2010, 182-190.)

The motivated change process team will achieve short-term results during the change process when they follow the change strategy and vision. **The results must be communicated** and these goals will help to get more people to support the change. However, the short-term goals do not ensure that the whole process will be successful. It is important not to give up and to keep the motivation high during the whole process. **The change has to be integrated to the organizational culture. The** old traditions cannot influence on the new working model. The structures and the systems have to support the change and new way of working. The most important phase during the change is the **constant communication** of the progress of process. This means using different communication channels that appeal to the feelings. It is important that everyone in the organization understand the importance of the change. (Kotter & Whitehead 2010, 182-190.)

Management must emphasize that the **change is positive and necessary** to the organization (Russell-Jones 1995, 59-93). The upper level management must work as an example for the whole organization in the change process to promote the common vision. The leader must also remember that the managing is a social process and they have to take differences of people into account. There are also differences in work tasks, nationalities, ages and cultures of the employees that have to be considered and also utilized in different projects. It is important to promote the equality within the organization. The leader must motivate and reward the employees as well develop their skills. Neutral feedback is essential when handling differences and discussing with employees. The role of leader is more like as a coach or enabler of actions, so that the employees can work independently. The work satisfaction of employees will improve the results and helps to keep the good employees in the organization. (Ruohotie 2000, 282-292.)

The change process also requires **the commitment of people** (Kotter & Whitehead 2010, 182). People are usually reluctant to change and may have different feelings against change such as fear, negligence or denial. The new situations may feel inconvenient because of the value structure each individual has. The adaption to new situations requires change in person's values, competencies and habits. The changes have to be seen as opportunities that will provide new possibilities and help to develop skills. (Beerel 2009, 9-12.) The people can influence on the change of practices by altering their own knowledge, competencies, beliefs and aims. The change has to be put into practice in the daily work and processes. (Loveless, DeVoogd & Bohlin 2001, 73.) The shareholders, suppliers, authorities and other stakeholders have to be taken account when creating a change (Russell-Jones 1995, 43).

Change resistance is reduced by offering training and education, clear communication, defining reasons for change, cooperating and involving the employees in the change process (Russell-Jones 1995, 59-93). Cooperation and networking with visionary organizations can help other organizations to learn and develop their work (Cornford & Pollock 2002, 91-92).

The organizational culture can disable the change process. It is important to identify the organizational culture and find the reasons what are the norms and

ways of working. The history of organization, the environment, the leadership culture, the employee structure, the purpose of the organization, the ownership structure of the organization and use of technology influence on the organizational culture. (Russell-Jones 1995, 49.) Russel-Jones (1995, 53) describes the forms of organizational cultures and claims that most of the organizations like to work as a role models and their structure is like a Greek temple. In role model organization, the information is managed from top-down. The stability is important for this kind of organization and the culture is not easily altered. The change needs to be performed carefully and systematically by changing the policies and structures. (Russell-Jones 1995, 53.)

Policies for change also need to be identified in the universities, which are deciding to include digitalization in the organizational strategy. The innovators of the organization have to follow the changing trends of technology and participate in development teams or communities. The innovators will sense the need of change and also prepare the organization to those changes. The communication is vital to improve the knowledge exchange. The governance supports these innovators. Development teams can meet regularly and to discuss about the new technologies. Their duty is also to crystallize the vision of technological strategy. The members of this team can be from different organizational levels, including the students. However, the team should be also given authority to influence on the organization's decisions. It is also important to organize pilots or trials before implementing full change. The well-designed pilots will increase the success of the technological projects. The benefits and results of the project should be communicated clearly within the organization. However, the people are the center of the change process, not the functionality of technological system. (Davis, Little & Stewart 2008)

In the next chapter, the learning theories are investigated in order to create understanding of organizational learning and the individual learning process.

2.4 Learning theories

In order to understand how technology influences learning and how teaching has been changed, learning theories need to be examined. The learning theories must

follow the trends and changes of the global world. The culture regulates what kind of learning theory and knowledge must be created in order to respond to the requirements of the environment. (Ojanen 2009, 38.) Technology-based learning is usually connected with constructivist learning theory (Bates & Sangra 2011; Koponen 2008, 149-150; Ally 2008, 19-33). However, cognitive psychology and connectivism learning theories are also connected to technology-integrated learning (Ally 2008, 19). Connectivism is the newest theory of education. Connectivism supports the connection between higher education and knowledge work, because this theory takes into account organizational learning and technology. (Siemens 2004)

Behaviourism

Traditional learning theory, behaviourism, was the ruling theory in education 40 years ago, but this theory still exists. The systematic planning of education, competence-based learning and programmed learning are parts of the behaviourist teaching style. (Ruohotie 2000, 108.) Behaviourism is connected with positivism. Behaviourism identifies only things that can be justified with experimentation and monitoring. The objectivism is a base for behaviourism and it claims there is only one existing truth. The individuals cannot effect on the truth with their own perceptions. The aim is to change the individual's way of thinking towards certain goal and understanding. The learners cannot reflect on what has been taught for them and they cannot contest the truth. (Boghossian 2006) The use of own imagination and thinking is denied (Ruohotie 2000, 108). In behaviourism, the knowledge and the reality are strongly connected and it was important to transfer the knowledge from the teacher to the learner (Ojanen 2009, 39).

The behaviorist learning theory claims that the behavior of persons can be changed due to the learning process and the environment. The learner cannot influence his or her own learning experience. The learner can receive outside influences and training that makes the learning experience stronger. (Ruohotie 2000, 108-110.)

Cognitive psychology

According cognitive psychology, the learning process requires memory, motivation and thinking. It is important to reflect on what has been learned. The learner uses short and long term memory as well their senses during the learning process. The real life context in learning should be stressed, so that the learners can deepen their understanding. The learner can use observation and their past experiences to perceive their learning. The information have to be processed after it has been reflected. (Ally 2008, 19-26.) The beliefs, values and existing knowledge can effect on finding new information and learning. The learners own perception effects on the information he or she feels important. Cognitive psychology takes into account the learner's own needs and the different learning styles. The teaching is seen as an event that has been organized. The knowledge is adopted and processed in the learner's own mind. (Ruohotie 2000, 110-112.)

Constructivism

The term constructivism was created in the end of 1960s (Ojanen 2009, 38). According to the constructivist theory, the learners can participate in designing their own learning processes. The learners can form their own individual knowledge base by their own interpretation. The interpretations depend on the person who is interpreting the truth. In pedagogy, this means the role of the teachers will change as the teachers instruct the learners to find the understanding of the matter. (Boghossian 2006) In constructivism, the individual analyzes and interprets the information based on the existing knowledge she or he already has. The knowledge is built over time. The individual will learn to be critical and this helps them to work in the society. The individual can participate on developing her or his own work. The high technology helps to make own research and experimentations. The learner's values, experiences and the learning environment influence on the learning process. (Ojanen 2009, 39-43.) In constructivism, the people are working in groups and it is important to have open discussion about different ideas. It is essential to know how to find the information rather than trying to learn everything by heart, because nowadays the knowledge is changing rapidly. (Bates & Sangra 2011, 45-46.)

Problem-based learning, active learning and situational learning terms are created from the constructivist learning theory. The constructivist theory can be utilized in the role of instructor (Ojanen 2009, 21-52). The role of instructor is closely related to the technology integration of education as the teacher's role has been changed to instructor's or guide's role (Bates & Sangra 2011, 48-50).

Connectivism

Information technology and the environment around us is changing rapidly, so that the learner has to constantly adapt to new situations and learn new things. The learner cannot affect what has to be learned, because the surroundings and new innovations determine what should be learned. (Ally 2008, 20.) Many old processes are supplemented with technology and old learning theories are not required. The person has to have the abilities to find information. Work and education are closely related and life-long learning. Continuous learning is prerequisite for the society. The connectivism theory is the newest theory to challenge the old learning theories. The older theories do not consider at all the organizational learning and outside forces like technology. Connectivism fits to the social environment we are living at the moment. (Siemens 2004)

The connectivism is closely bound to the work of knowledge workers, because they have to constantly live in the middle of chaos. Knowledge workers have to find meanings as to why things happen in certain ways. The ability to react to changes, adapt to the changing decisions and create and maintain networks with other people are also important in knowledge work. The information has to be gathered from different sources and combined. The ability to evaluate the intrinsic value of knowledge is also part of connectivism theory. The learning can be situated outside of the learner's influence. The information has to be shared and organized in adequate way to reach the correct group of people within organization. The knowledge in organizational databases has to be transformed in an understandable form and to be communicated to the employees. The employees need to update their information and skills in order to success in the work life. (Siemens 2004)

E-learning and mobile learning

E-learning is defined as the combination of learning and Information communications technology (ICT). Learning happens, when the person is influenced by the outside environment and combines the information from different sources in his or her own mind with her or his earlier beliefs, values and know-how. Learning can happen in various learning environments and the person's state of mind will change and create new kinds of beliefs, values and know-how than there originally were. E-learning is defined as exploiting ICT in the learning process as the tool to change the original change of mind to new state of mind. The ICT can be used to obtain, save and process information. (Koponen 2008, 14-15.) This can be called the e-learning process and it is illustrated in Figure 12:
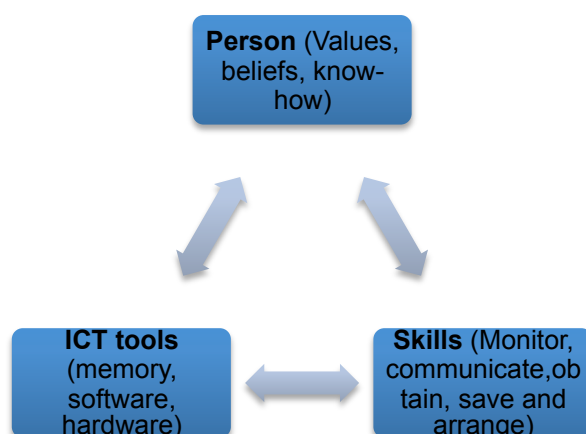
Figure 12. The e-learning environment from the learner's point of view (Koponen 2008, 15)

E-learning technologies enable just-in-time learning and do not bind the learners to a certain time, place or situation. They also increase interaction and help learners to improve their occupational skills and ensure process of lifetime learning. (Kanuka 2008)

The ICT environment includes the technical and informational abilities that the learner can exploit in learning and extending his or her learning perspectives. ICT-enabled learning helps the learner to communicate and work with the outside environment. (Koponen 2008, 14-17.)

The mobile learning offers improved connections to other people in social context and makes it easier to access information. The virtual and physical environments can be experienced with the help of mobile technology. People can communicate with each other, or connect to systems or information in these surroundings. (Koole 2009, 25-27.) Koole (2009, 27) has created so called FRAME-model to support the theory of mobile learning. The FRAME-model divides mobile learning into three perspectives, which are social, device and learner viewpoints. These perspectives are illustrated in Figure 13. With these areas, the mobile learning experience can be evaluated and designed. (Koole 2009, 27.)
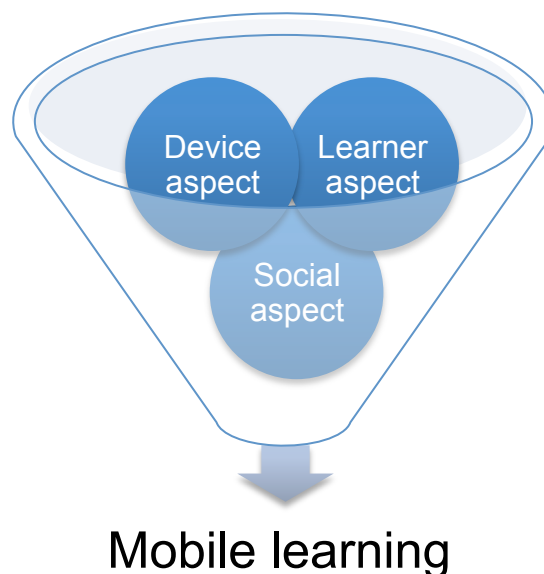
Figure 13. The FRAME-model of mobile learning (Koole 2009, 12)

The device perspective comprises the physical, technical and functional features of the mobile device. These features support the usability of the device, because they improve the device performance. The learner's perspective consists of a person's previous knowledge, memory, feelings and motivational factors. These factors have an effect on handling the information. The social perspective describes the interaction and collaboration for changing knowledge and information. The culture has great impact on the social communication and behavior. (Koole 2009, 27.)

As can be seen in 14 Figure, the perspectives are overlapping and form intersections with each other. The device must be in connection with the learner to increase usability of the device and the device must meet the requirements of the learner. The social and device perspectives are also overlapping in the FRAME-model in order to increase connectivity of group of people and different systems. The social and learner perspectives form so called interactive learning intersection where different learners from different starting points can use their cognitive skills and knowledge to learning. When combining all these perspectives, the model of mobile learning is created. With the help of mobile technology, the cooperation of the learners and systems is increased, the information is much more easily available and the learning experience is deepened. The information can be shared at any time, place and whenever it is needed. Using mobile technologies in learning will reduce the cognitive stress of learners. The learners also learn to evaluate what kind of information is required and how it will be used. **(**Koole 2009, 28-41.**)**

2.5   Summarizing the factors influencing digital competence development

In this chapter, the theoretical part is summarized in order to understand the digital competence development process.

RQ1: What are the key factors influencing an individual's digital competence development?

As mentioned earlier, the strategy directs the processes of the organization and individual (Senge 1990; Sydänmaalakka 2009). The strategy is also essential when developing something new, because clear objective and purpose has to be defined. The strategy can be personal goal or target that drives the person to achieve something important to him/herself. The awareness and identification of the change is required when preparing to change the way of working (Kotter &Whitehead 2010; Senge 1990).

The motivation is crucial for the success of the competence development process (Kaplan and Norton 2002, 234-197) and any other projects. The motivation is

something that the individual has towards performing something and it can be supported by different factors. The organization help in motivation. The motivational factors are listed on Figure 14 based on the theoretical part:
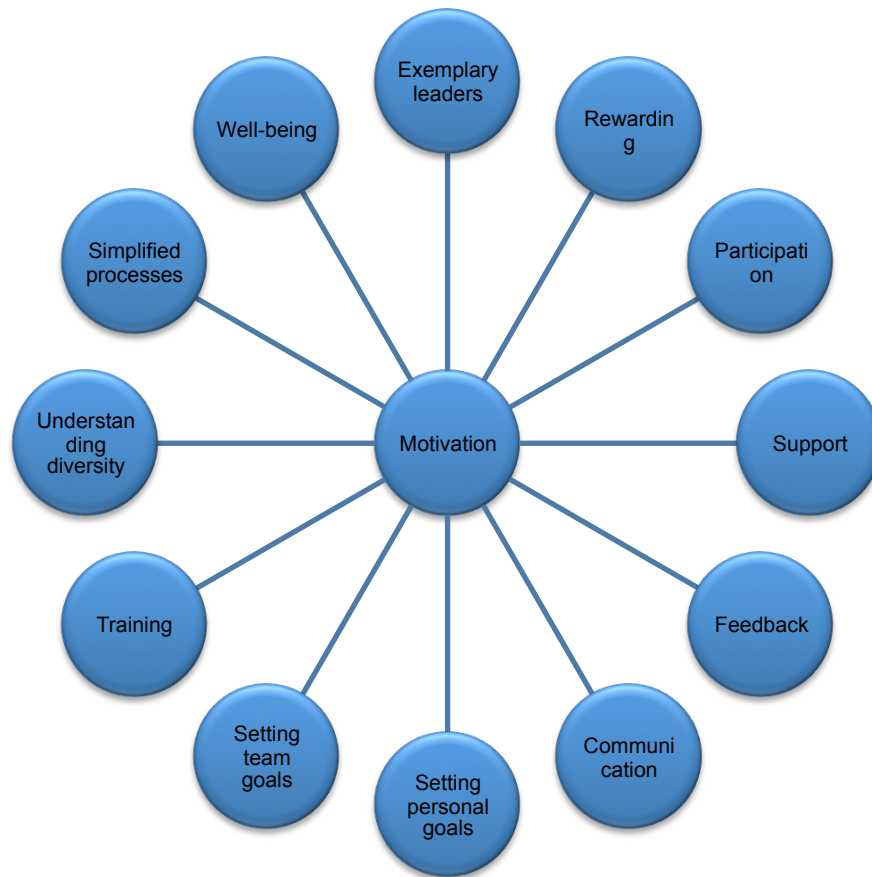
Figure 14. The competence development factors (Koskinen)

The learning process is influenced by different learning theories, as mentioned in chapter 2.4. Learning can happen on an individual or organizational level. Learning is influenced by different learning theories, methods, trends, tools and environments. The theories of the e-learning environment (Koponen 2008), organizational learning Senge (1990), knowledge sharing Nonaka & Takeuchi (1995) and mobile learning (Koole 2009) can be modified to describe the digital learning environment.

The learner is connected with the digital learning environment and the learner has the ability to use the technology, like the different digital processes, software, applications and devices. The learner's own values and beliefs influence on the

process. The learner may have different expectations towards the process according his or her earlier experiences. The learner has to be open and motivated in learning new skills. The skills are related to handling different digital processes and ability to combine the existing knowledge with the digital content knowledge. The digital literacy is required to use digital technology. The learner will use the digital devices, software, environment and applications to support the learning process. The different learning methods support the learning process as mentioned in Chapter 2.4. The learner is the center of the whole process and his or her motivation influences on the ability to learn. (See Figure 15)
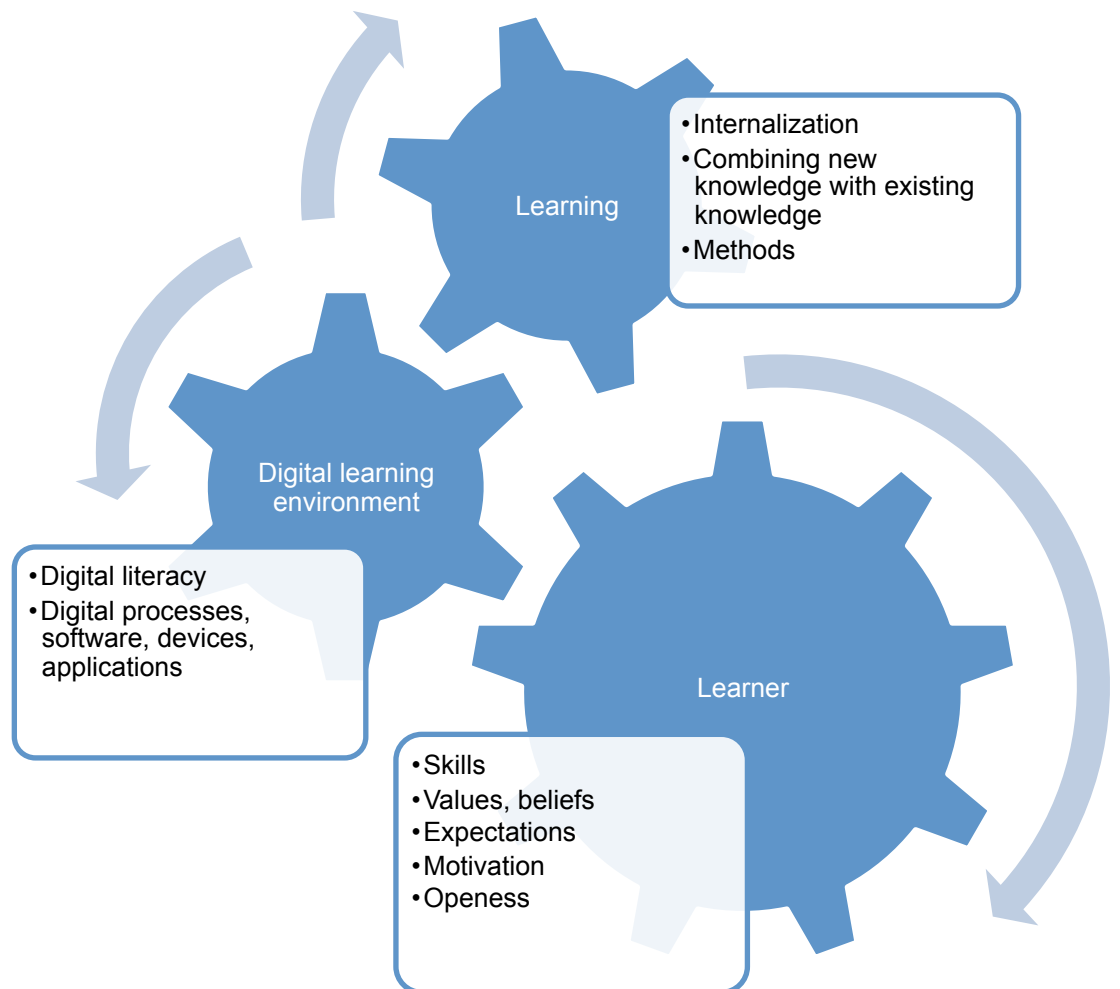
Figure 15. Digitalized learning environment (Koskinen)

In the next chapter, the research approach is discussed more thoroughly.

3   RESEARCH CONTEXT AND METHODS

In this chapter, the research approach is introduced. This section will also indicate how the primary and secondary data of the empirical study were gathered. The research methods were selected to support the research area.

3.1   Research approach

The primary approach of this work is the quantitative research method. However, supplementary interviews were conducted in order to deepen the understanding of the topic. The interviews and the competence development survey work as pre-assessment of the situation of digital competence development in LUAS. The pre-assessment works as a starting point for the larger development process. With the help of the study, the factors influencing on the digital competence development can be found out. The study can anchor the continuous learning and development to the practices of LUAS human resource department.

The charactersistics of quantitative and qualitative method are combined to increase the reliability of the study. The quantitative research method can be used to make objective descriptions of phenomena. The quantitative method helps to find out different principles or laws concerning large groups of people. The interrelationships and differences between different variables are examined and evaluated in a controlled environment. However, as in any behavioral science, quantitative research cannot assure the neutrality of research. The other problem is that human behavior cannot be completely measured by quantitative research. Different statistical tools are used to process the data and the purpose is to report the findings. The survey should be pretested before launching. The researcher has a clear vision what she/he is looking for. (Taylor, Williams & James 2010, 52-55.)

The aim of the qualitative research is to describe the reality, which is affected by human actions, for instance desires, beliefs, values and attitudes. The aim is to get a deep understanding of the reality in order to attain comprehensive picture of the matter and to write facts. The purpose is also to reveal the existing facts of the reality and not just to justify the results gained from the research. However, the values and attitudes of the writer are effecting on the creating the understanding of

the research area. It is difficult for the researcher to be neutral and to look at the matter objectively, because the research area and the knowledge of the researcher are closely affecting each other. (Hirsijärvi, Remes & Sajavaara 2007, 156-157.; Airaksinen & Vilkka 2003, 63.)

The Table 3 illustrates how the qualitative and quantitative methods are used in order to achieve the objectives of this Master's thesis.

Table 3. The research approach

	Qualitative method	Quantitative method
Objective	To understand the underlying motivations and the reasons	To map the factors influencing on competence development
	Current literature on topic, Other researches: European Union, NMC, OECD	To understand the development areas
	To uncover dominant trends	Comparing the skills of different teacher groups
	E-books, literature, oral sources	Generalizing the results and measuring the general opinions
	To discover the competence requirements and the thoughts and opinions behind the topic	**Competence development survey**
	Interviews	
Sample	Small number of respondents	Large group of randomly selected respondents
	The theoretical framework	**Teachers of LUAS**
	Persons from *Strategic* management of LUAS, Employees of LUAS, (Appendices 1,2,3)	**(Appendices 5 & 6)**
Data collection	**Unstructured and structured interviews, literature**	**Online questionnaire Webropol**
Data analysis	**Thematizing, classification**	Statistical evaluation of data **Excel worksheets + databases, Calculation of correlations, grouping**
Outcome	Supporting the recommendations and conclusions	Recommendations and conclusions

Next, the data collection methods are introduced.

3.2 Preliminary interviews

The interview is one way to collect qualitative data. With the help of open interview, the assumptions, opinions and feelings of the interviewees are clarified. The interview situation has to be open and genuine. There is no clear structure for the interview and the subject of the interview can change in the middle of the conversation. That is the reason why open interview is usually described to be more like a conversation than an interview. (Hirsijärvi etc. 2007, 204.) The interview can be informal conversational interviews or it can be structured theme-interview (Hirsijärvi etc. 2007, 160; Airaksinen & Vilkka 2003, 63.). In conversational interview, the questions are invented during the conversation based on the conversation flow. The data collection can be difficult because it cannot be done systematically. (Cohen, Manion & Morrison 2001, 181-184.) The interview can be also so called expert interview, where the respondents are carefully selected. These experts can be working in organization and they have the best knowledge of certain topic. (Metodix)

The interviews were analyzed and thematized according to similar patterns. The classification was used to find similar patterns repeated during the interviews. The classification and thematizing helped in comparing the data and to identify the most important facts.

The interviews with the employees and management of LUAS were used to create in depth understanding of the theoretical framework and the problem space. The interviews helped to familiarize with the case organization and to general view of the matter. The language in the interviews was Finnish. The duration of the interview was approximately one hour and the meetings were arranged beforehand. The topics were agreed in beforehand. The interviews were organized in school premises, but in different locations.

Table 4. describes the type of interview, method and the aim of each interview.

Table 4. The preliminary interviews

Type of interview	Method	Objective
1. Initial interviews (Appendix 1) *Mrs. Satu Hyökki* Project Manager of Lahti Region Development Company *Mr Hannu Kaikonen* Project Manager of Lahti Region Development *Mr. Harri Kuusela* Development Manager of Lahti University of Applied Sciences.	In person, discussion 16.10.2013	To get understanding of the current situation of digitalization and listen the needs of the case company
2. Initial interviews (Appendix 1) *Mr Harri Kuusela* Development Manager of Lahti University of Applied Sciences	In person, discussion 2.12.2013	To discuss more about the aims of the case organization and level of digitalization. Also the new BYOD-strategy was discussed
3. Expert interviews (Appendix 1) *Mr Tommi Kangasaho* ICT Manager of Lahti University of Applied Sciences	In telephone, discussion 5.12.2013	To understand the viewpoint of the ICT department of LUAS towards digitalization and BYOD, to understand the costs of technology investments.
4. Expert interviews (Appendix 1) *Mr Mika Rauhala* System Manager of Lahti University of Applied Sciences and PHKK *Mrs Satu Hyökki* Project Manager of Lahti Region Development Company *Mr. Hannu Kaikonen* Project Manager of Lahti Region Development	In person, discussion 24.2.2014	The progress of the digitalization, discussion about the division of work in the change process
5. Professional interviews (Appendix 1) *Mr Harri Kuusela* Development Manager of Lahti University of Applied Sciences *Mr Paananen Harri* Lecturer of Faculty of Business Studies / Computer Sciences	In person, discussion 3.6.2014	The discuss the benefits of the learning technologies and experimental learning, understand the matter from teacher's point of view, see how the innovators of the organization work and what would they develop the process of digitalization
6. Expert interviews (Appendix 2 & Appendix 3) *Mrs Maarit Fränti* Development Manager of Lahti University of Applied Sciences	In person, structured interview 2.10.2014	To understand digitalization as a part of the LUAS strategy, the competence development of teachers, the strategic development, quality assurance
7. Expert interviews (Appendix 1) *Mr Harri Kuusela* Development Manager of Lahti University of Applied Sciences *Ms Jenni Meriläinen* Designer in Teaching Technologies in LUAS	In person, discussion 11.5.2015	To gather information of development projects and problem areas in process of adapting digitalization in education

The interviews were written down and the structured interviews were transcribed. Digital audio recording was used in the 6. interview, all the others interviews were conversational interviews. The recording has been stored and saved into a virtual cloud and external hard disk. The conclusions from these interviews are drawn together by using classification and thematizing methods. Also the observation method was used because in conversational meetings the flow of the conversation was not stream-lined. The results are described shortly in table and these results supplement the actual survey. The interviews are summarized in the Appendix 1 and 3 and only the key points based on the topic are written down. For the cross-analysis, the essential information is gathered to the Table 5.

3.3   Competence development survey

The survey was carried out in order to find out the teachers' thoughts, feelings and attitudes towards digitalization and the competence development. The data collection method was questionnaire. The competence development survey was conducted anonymously and the respondents were random teachers within LUAS. The draft of the survey was sent to 3 people outside the LUAS organization in order to check that the questions are understandable and clear. There were some adjustments made before the survey was sent so that all questions were understandable.

Webropol, a web-based survey tool, was used to create the survey. The survey was quite short and it consisted of 15 questions. It was sent to all teachers in LUAS. The questionnaire was structured and it had only one open- ended question. The open-ended question offered the respondents to write their own thoughts regarding the matter. In the closed-type questions, there were options that the respondents could select. The language in the survey was English. The prelimary survey can be seen in the Appendix 4. The link to the survey was sent by email to the office secretaries of the each faculty and they forwarded the survey to the teachers. The questionnaire was sent on 12th of August in 2015 and the reminder was sent a week after this on 18th of August in 2015 to increase the response rate. The third reminder was sent on 27th of August in 2015.

The questionnaire concentrated on the digital training needs of the teachers and tried to clarify their attitudes towards digitalization. The questionnaire consisted on four sections, which were background, competencies, training and digitalization. All of the questions were compulsory. There were both multiple choice and one-option questions. The volunteers could leave their contact details in the end of the survey in order to discuss more about their competence development and training needs.

The teachers were categorized according to their title and work experience in LUAS and outside LUAS. By using this background information, the respondents could be compared. 16 of the respondents were lectors and there were eight full-time teachers. Only two principal teachers responded to the survey. There was one part-time teacher answering to the survey. The principal teachers were not compared to other teachers in order to maintain the anonymousness of the respondents. The titles of the respondents are represented on Figure 16:
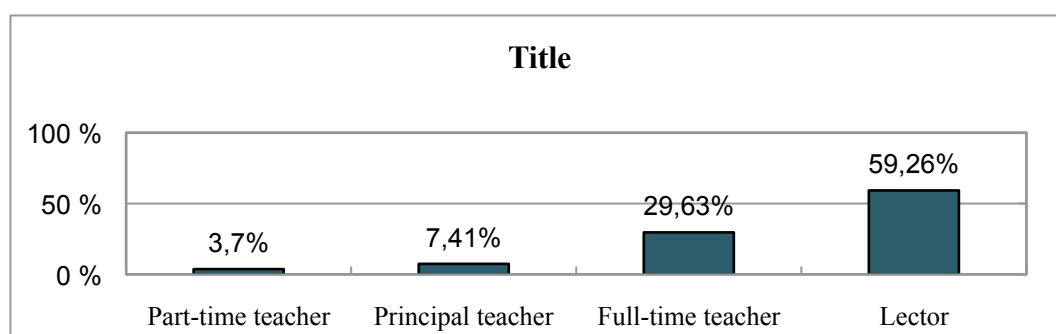
Figure 16. The titles of the respondents

Most of the respondents (40, 7 %) had less than 5 years work experience in LUAS, but there were also respondents who had been working over 15 years in LUAS. The minority of respondents had been working 10-15 years in LUAS. (Figure 17)
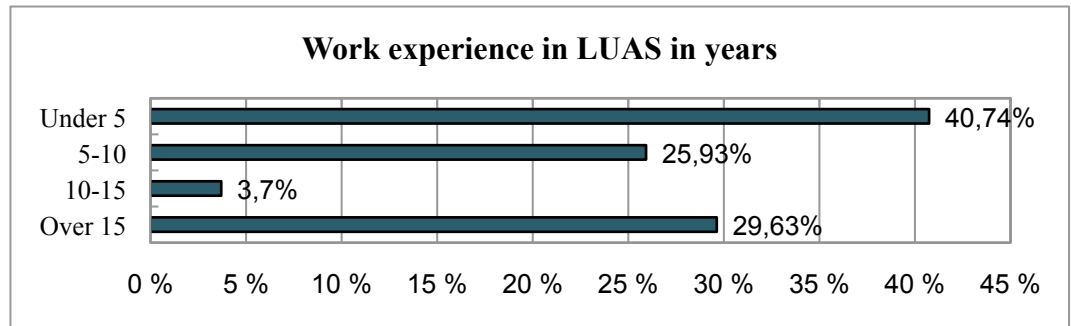
Figure 17. Work experience in LUAS

Interestingly, all of the respondents had experience from other occupations than teaching. Over 44 per cent of the respondents had been working in other occupations over 11 years. (Figure 18)
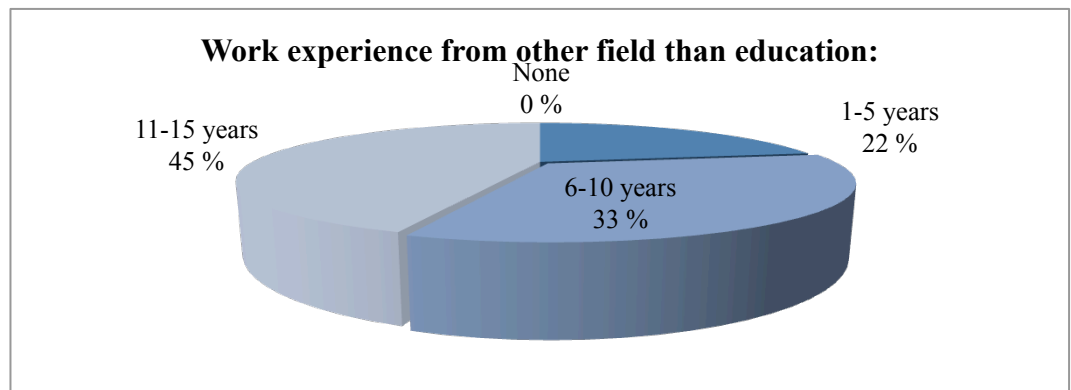
Figure 18. Work experience from other occupation than teaching

4   THE RESEARCH RESULTS

This chapter reveals the empirical results. First, each method is introduced separately and the results are combined. Secondly, the results are cross analyzed and recommendations are made based on the findings. At the end of this chapter, the research questions are being answered.

4.1   Preliminary interviews

In order to understand better the future challenges and the current situation of LUAS, interviews with LUAS were carried out. The interviews helped to formulate the image of the current state of digitalization in LUAS and these interviews support further understanding of the competence development survey. The results of the interviews are gathered in Appendix 1 and 3. In the Appendix 2, the questions related to the strategy can be found. In the Table 5, the analysis of the answers are represented:

Table 5. Analysis of the preliminary interviews

TOPIC	FINDINGS
1. Current	• The faculties are scattered • Different technical requirements in each faculty • Expensive maintenance, obsoleting devices • High costs of computer rooms • Mobility of teachers and students supported • Information from costs of investments not available due different cost structures • The positive attitude towards change required, especially among teachers • Pedagogic ground rules need to be created • Decision of digitalization needs to come from management • Common vision of digitalization • The successful achievements for instance in alternative learning projects should be communicated • Work duties need to be clarified • Cooperation should be increased • Individual teachers are performing alternative learning methods and keen on new educational technologies **CONCLUSION:** The performance improvement required from the management side, the employees require more support, change process required, work descriptions should be created and common vision towards digitalization needed
2. Future	• Innovative learning environments in Niemi Campus, convertible rooms, special infrastructure • Unified policies and structures for faculties (privacy, security, software solutions) • Students should buy the software by themselves and bring their own devices • Virtual learning, teachers competence development • Digitalized education • Cooperative work environment, all faculties at the same location **CONCLUSION:** Cost-efficiency, the teachers are required to learn new skills to provide assistance to students in new learning environments, ability to use different learning environments
3. Strategy	• Flexibility of organization increased by the change in organizational structure • Critical success factors are measured constantly (integrated pedagogy, innovativeness and increased entrepreneurship of students) • Strategy is part of quality system • Constantly following the operational environment (trends, legislation) • Changes communicated in Intranet, not regularly updated • Providing feedback is supported • Employees can participate on strategic development, but they should participate more • Cooperation with local companies and international coordinates should be increased **CONCLUSION:** Cooperation and feedback should be increased, Quality-assurance of strategic objectives is performed at the moment, The operational environment is constantly followed, the interest on developing strategy should be increased, cooperation and communication with the external shareholders should be increased
4. Competence development	• Competence development supported, amount of different competence requirements is high and it is problematic • The teachers should participate in different development processes, like professional communities, development days, project teams • The training days and mobility of teachers are supported • Teachers should increase the knowledge sharing with each other and in different web-portals • Variety of teacher competencies due different faculties and own interest on digitalization • Teachers have the chance to try different learning methods • Teachers are requiring changes to reward policies to increase motivation **CONCLUSION:** The competence mapping is at the moment difficult due different requirements of faculties. The teachers should show interest on developing their own skills, Self-development is responsibility of individual, Support provided by organization.

The conclusions based on the preliminary interviews are supplementing the findings of the competence development survey. In short, the organizational

support for learning new skills is provided and the teachers can participate on strategic development of the organization. There are different voluntary-basis project groups and strategy development days. The teachers can also participate on different competence development training days. The mapping of different competencies is hard, because they are different faculties with different teacher ability requirements.

Digitalization is quite a new concept and positivity towards this new concept is required behalf of the teachers. Some of the respondents felt that digitalization should be clearly addressed from the management and effective policies should be created. The responsibilities and tasks of each department should also be considered. The organization is constantly trying to find cost-effective ways to perform and create new effective processes. The operational environment and new educational trends are followed. In the future, teachers are required to learn new skills related to digitalization and they should support the students in their learning. The teachers are encouraged to try alternative learning methods and tools, but it is dependent on the individual's own interest. According to the development team, the teachers are requiring changes in the reward policies in order to increase motivation. Cooperation and knowledge sharing should be increased. The feedback and quality are constantly mapped. According to the strategic development team, cooperation with local companies should be increased.

Because teachers are the ones who are closest to the students and provide the first-class education, there was a need to map the teachers' competencies in digitalization. The competence development survey is discussed in the next chapter.

4.2   Competence development survey

The competence development survey was sent to 225 teachers inside LUAS and 27 teachers replied to the survey. The response rate was only 12 per cent. The timing of the survey was set to the beginning of the autumn semester, so this may have influenced the response rate. Three of the teachers left their contact details for further discussion.

The correlations between the questions were calculated by mathematical means in order to understand the dependencies between the questions. Figure 20 represents the correlation matrix. The numbers that are marked in bold in Figure 19 are statistically significant. The correlation matrix was used to interpret the correlations of seven questions. The correlations were transformed into figures. In each figure, the relationship of two questions is described in the form of chart. The X and Y-axis represent the questions and the plots in the chart are the answers. The correlations are represented in the Chapter 4.2.4.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	0	-0,16	-0,08	0,2	0,25	-0,05	-0,26	0,09	0,24	-0,33	0,12	0,05	0,06	0	-0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	-0,16	0	1	-0,12	-0,34	0,04	0,2	-0,17	-0,2	0,09	0,09	-0,11	-0,25	0,2	0	0,04
4	-0,08	0	-0,12	1	-0,08	0,23	-0,15	0,12	0,42	-0,05	0,35	0,3	-0,12	-0,18	0	0,15
5	0,2	0	-0,34	-0,08	1	-0,12	-0,27	0,35	0,13	0,14	-0,06	-0,05	0,01	-0,39	0	0,21
6	0,25	0	0,04	0,23	-0,12	1	0,35	-0,49	0,31	0,33	0,25	-0,06	0,13	0,32	0	0,06
7	-0,05	0	0,2	-0,15	-0,27	0,35	1	-0,38	0,08	0,06	0	-0,22	0,4	0,42	0	-0
8	-0,26	0	-0,17	0,12	0,35	-0,49	-0,38	1	-0,14	-0,28	0,1	0,31	0,11	-0,09	0	0,12
9	0,09	0	-0,2	0,42	0,13	0,31	0,08	-0,14	1	0,05	0,09	-0,3	0,14	0,05	0	-0,06
10	0,24	0	0,09	-0,05	0,14	0,33	0,06	-0,28	0,05	1	0,02	-0,32	-0,07	0,17	0	0,19
11	-0,33	0	0,09	0,35	-0,06	0,25	0	0,1	0,09	0,02	1	0,07	-0,13	-0,12	0	0,19
12	0,12	0	-0,11	0,3	-0,05	-0,06	-0,22	0,31	-0,3	-0,32	0,07	1	-0,16	-0,26	0	-0
13	0,05	0	-0,25	-0,12	0,01	0,13	0,4	0,11	0,14	-0,07	-0,13	-0,16	1	0,27	0	-0,1
14	0,06	0	0,2	-0,18	-0,39	0,32	0,42	-0,09	0,05	0,17	-0,12	-0,26	0,27	1	0	-0,12
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	-0	0	0,04	0,15	0,21	0,06	-0	0,12	-0,06	0,19	0,19	-0	-0,1	-0,12	0	1

Figure 19. The correlation matrix

The responses were changed into excel format and the responses were modified into percentages. The percentage rates were compared. The open-ended questions were examined by categorizing them according similar of patterns. The patterns were combined and grouped under same kind of themes. In the Appendix 6, the open-ended questions are attached. In this chapter, the competence development survey findings are introduced and compared. The list of the all replies is attached on the Appendix 5.

The teachers were asked to introduce the teaching methods they are using. Interestingly, all of the respondents are quite keen on using web-based activities in teaching, learning through projects, blended learning and physical contact

lectures. However, distant learning, using digital learning tools, students bringing their own devices and methods developing student entrepreneurship were not so widely used. The most popular teaching methods are still the physical contact lectures and learning through projects. (Figure 20)

Preferred teaching methods

Teaching method	Percentage
Web-based learning activities	48,2 %
Digital learning tools	22,2 %
Blended learning	51,8 %
Distant learning	18,5 %
Learning through projects	70,4 %
Work-based learning	40,7 %
Developing entrepreunership	11,1 %
Physical contact lectures	63,0 %
Students bringing their own devices	22,2 %
Other	
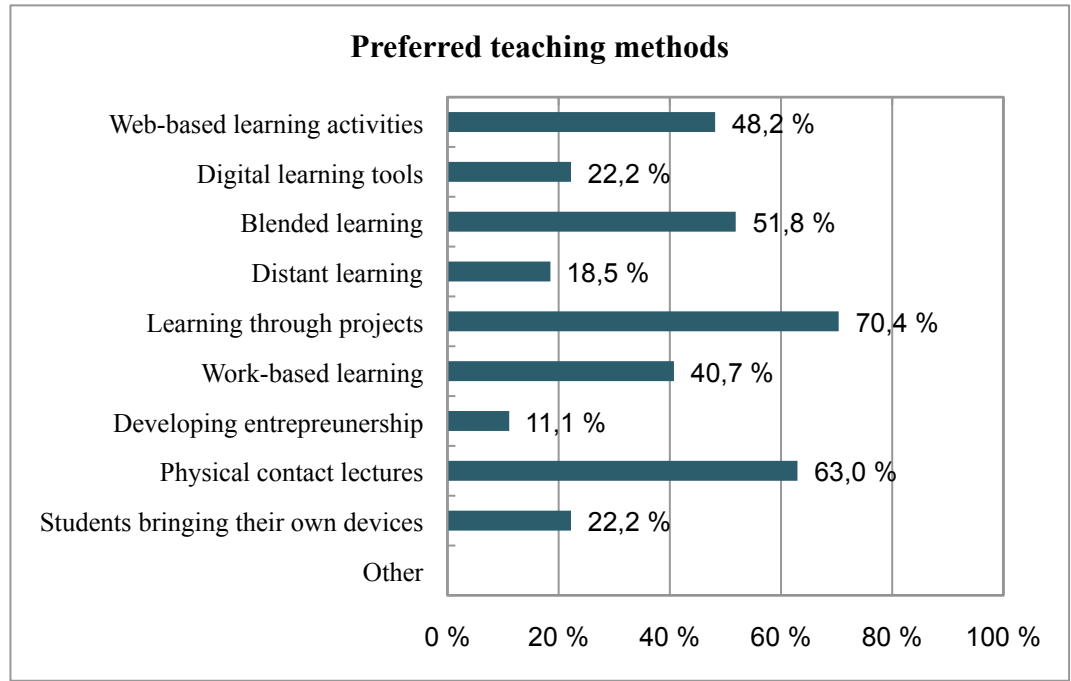
Figure 20. Preferred teaching methods

4.2.1 Competencies

The teachers were also asked to evaluate their digital skills. Only 7, 4 per cent of the teachers thought they have poor digital skills. Over 58 per cent of the teachers evaluated that their skills are excellent or good. (Figure 21)

Evaluation of digital skills

Excellent	18,5 %
Good	40,7 %
Fair	33,3 %
Below average	7,4 %

0 %   20 %   40 %   60 %   80 %   100 %
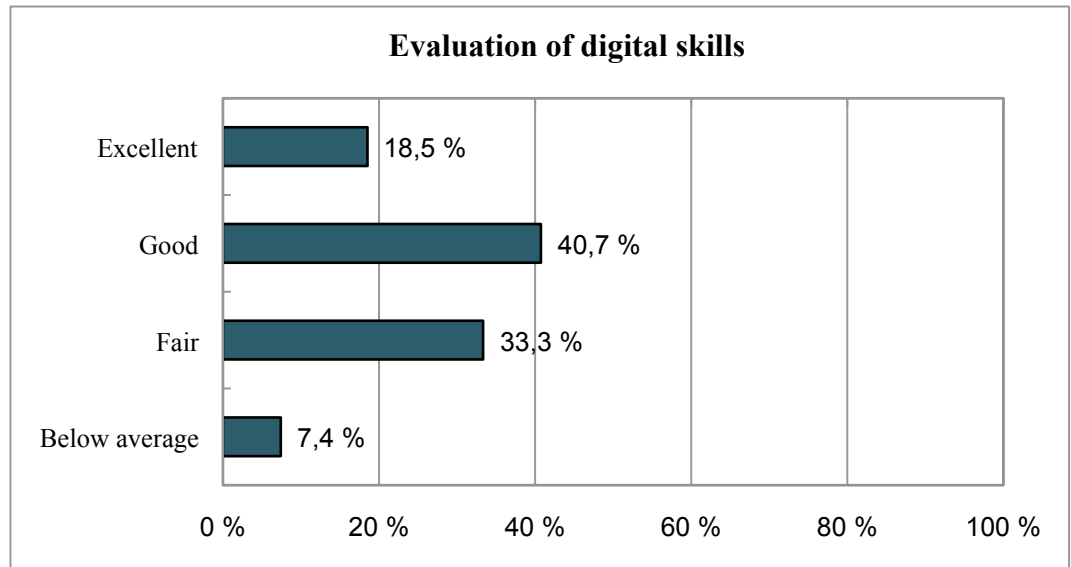
Figure 21. Evaluation of own digital skills

Most of the respondents felt that teacher education does not provide good digital skills and at least some update is required (See Figure 22). 29, 6 per cent of the teachers also felt that the teacher education provides poor skills for digitalization. Most of the respondents had been working in LUAS under five years according to the background questions, so it would be assumed that it has not been a long time since they have graduated. However, it was not asked when they had graduated from Master's degree in teacher's education.

Teacher education and digitalization

100 %
80 %
60 %
40 %
20 %
0 %

29,6 %   33,3 %   37,0 %

Poorly   Passable   Some update   Very well
                       required
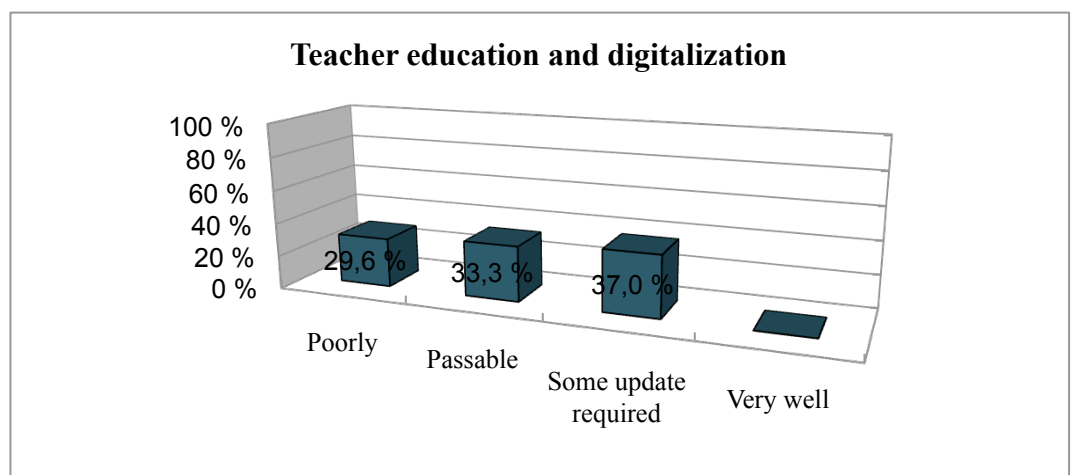
Figure 22. Teacher education and digitalization

4.2.2   Training needs

The teachers were asked how many times they have participated in training regarding digitalization. Surprisingly, there were teachers who had not participated in training at all. The majority of the respondents, over 55 per cent had participated on training under five times. There were only a few who had been participating on training more than ten times. There were no differences between the training when it comes to principal teachers and other teachers. The training times are listed on Figure 23:

Times per participating in digital competence development

11,1 %
55,6 %
25,9 %
7,4 %

Not at all   Under 5 times   5-10 times   More than 10 times
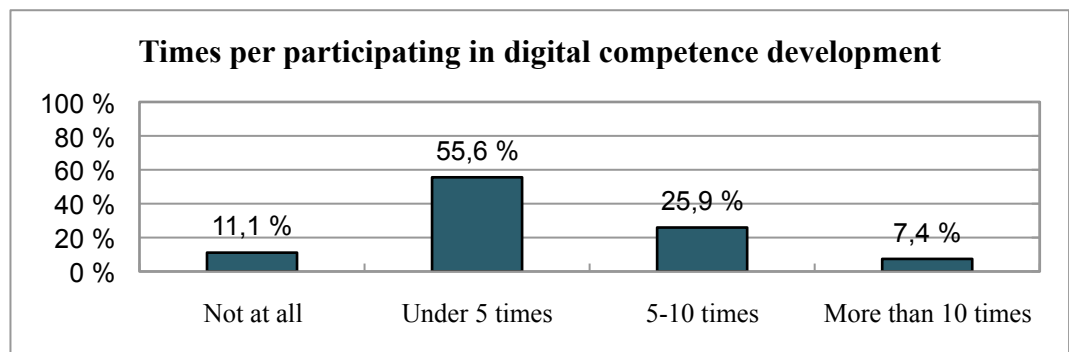
Figure 23. Times participated in digital competence training

According to the survey, over 77 per cent of the respondents assessed they have good or reasonable prerequisites to participate in training in digitalization. None of the respondents felt that they have no possibilities to participate. 22 per cent of the respondents evaluated that they can rarely participate in training (See Figure 24).
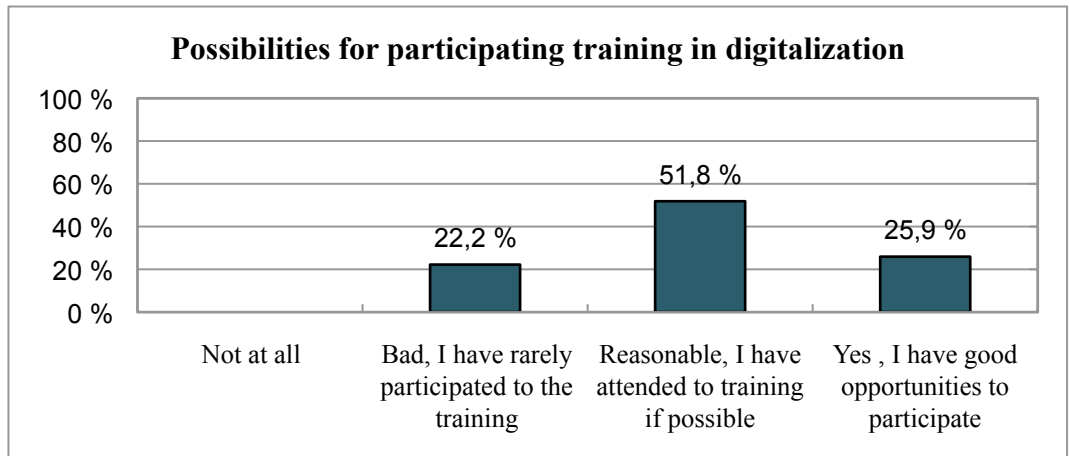
Figure 24. Opportunities to participate in digital competence development training

The respondents were also asked how they would participate in training. Over 70 per cent thought combined learning would be the most suitable way to learn. The others preferred training modes would be daytime training, lectures, e-learning and training abroad. Only 7, 4 per cent of the respondents would participate in training during the evenings after the work time (Figure 25).
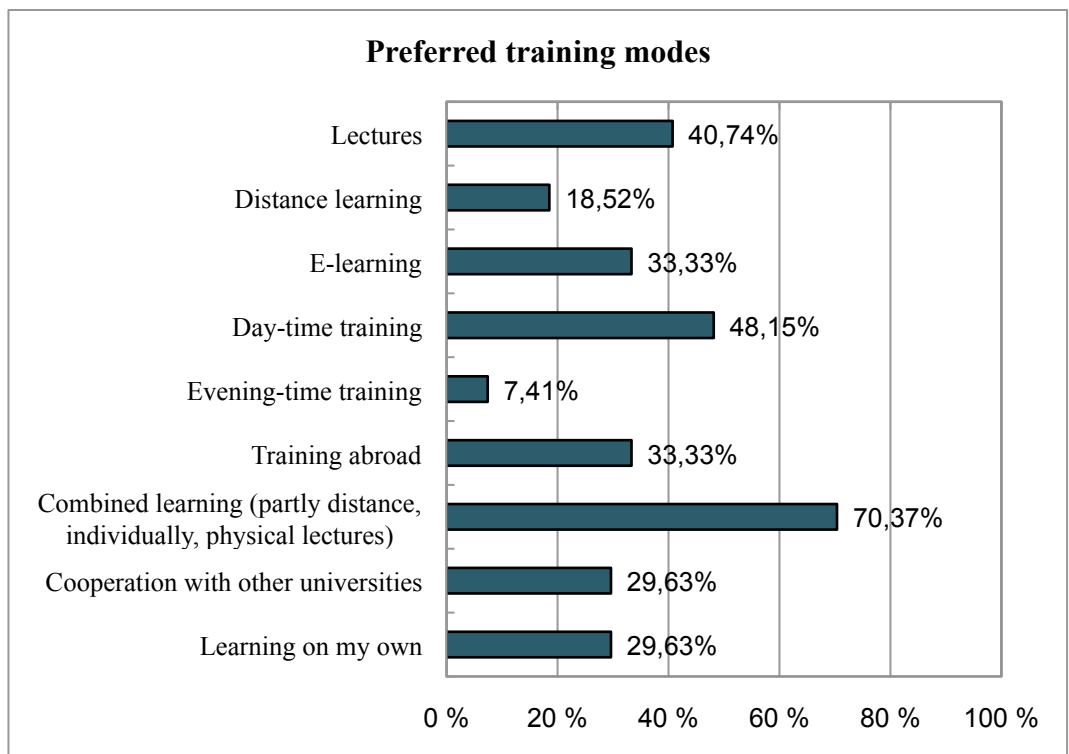
Figure 25.Preferred training modes

The respondents were asked who would be the most suitable organizer of training. According to the opinions of the respondents, their own employer would be the best organizer of training. Other universities of applied sciences and companies offering digital learning solutions for schools could be the next possible options for organizing training (Figure 26).

Suitable organizers of training

Category	Percentage
Own workplace	77,8 %
University	18,5 %
University of applied sciences	33,3 %
Private training house	18,5 %
Company offering digital learning solutions for schools	25,9 %
Ministry of education in Finland	14,8 %
European Union	3,7 %
Other	3,7 %
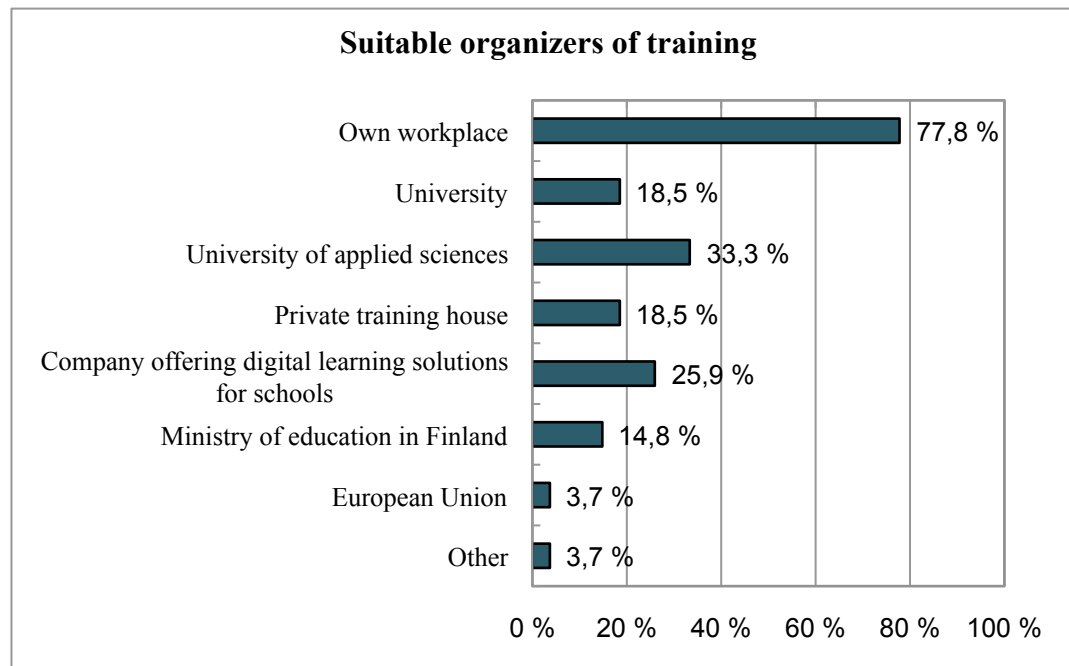
Figure 26. The most suitable organizers of training

The reasons for participating in training were personal development needs, the needs of the students and improving the quality of education. It would also be good to update the teacher education skills for the required level of organization. The achievement of strategic goals, the objectives of the faculty and advancement on the career were listed also important. None of the respondents felt that workmates are pressuring them to get training. In Figure 27, the reasons for applying to training are listed.

Reasons for applying on training in digitalization

Reason	Percentage
Own development needs	74,1 %
The recommendations from the workplace	14,8 %
The objectives of the faculty	25,9 %
Advancement in career	25,9 %
The needs of the students	66,7 %
The social pressure from the workmates	
Accomplishing the strategic objectives of organization	25,9 %
Updating teacher education competences	40,7 %
Improving the quality of teaching	74,1 %
Other reasons	7,4 %

Figure 27. Reasons for participating in digital competence development training

The development needs of the teachers related to digitalization are listed on Figure 28. The most important development areas were creating and editing digital material, using different classroom technologies, finding and using different learning tools and evaluating student performance in digital learning environments. The second most important were using blogs and wikis, social bookmarking, finding authentic web based content, using video and audio content, understanding privacy and copyright issues. Interestingly, the evaluation of the student performance in the digitalized learning environments was the most significant development issue.

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Development needs:

Create and edit digital material	55,6 %
Share resources in social bookmarking (ie. Pinterest)	22,2 %
Use blogs and wikis	25,9 %
Find and evaluate authentic web based content	25,9 %
Use video and audio content	33,3 %
Use digital communication tools	29,6 %
Communicate with other teachers in social networks	11,1 %
Identify plagiarized student works	3,7 %
Ethics	7,4 %
Privacy issues	25,9 %
Copyright issues	29,6 %
Using classroom technologies(ie. digital badges,presentation tools,online teaching)	63,0 %
Find and use different learning tools	48,2 %
Evaluate student performance in digital learning environments	59,3 %

Figure 28. The digital competence development needs

The main challenges to participating in training were mainly lack of time (77, 8 per cent of the replies). Secondly, there are problems in organizing one's own work (51, 8 per cent of the respondents). Thirdly, the lack of resources from the organization, like financing, was one of the main problems. Interestingly, the
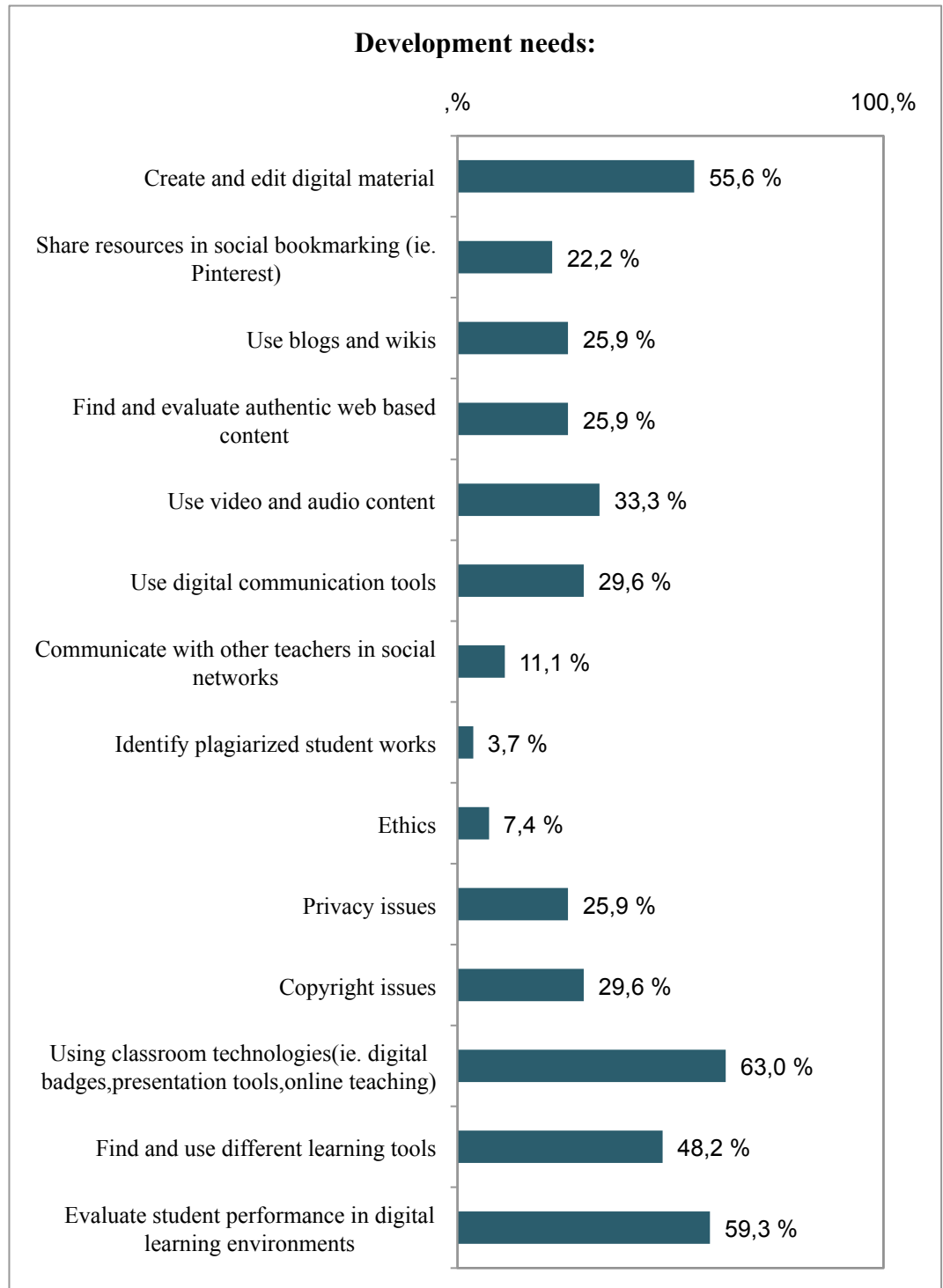
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respondents felt that their own interest and support from management were not preventing them from participating in training. The other reasons for participating in training were not covered (Figure 29).

The main challenges participating in training
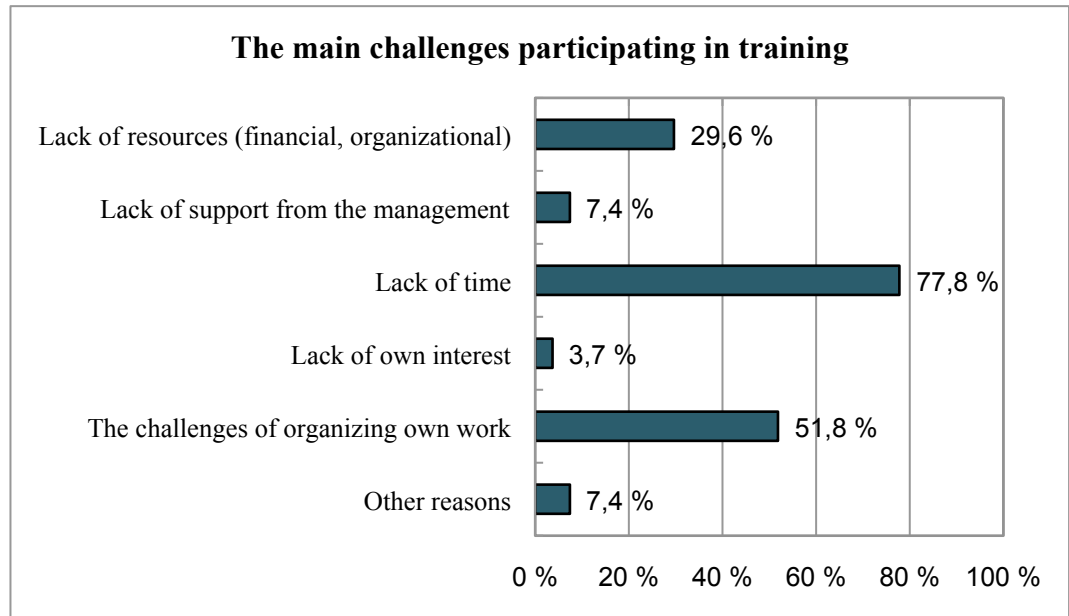
Figure 29. The challenges participating in training

4.2.3   Digitalization

According to the survey, the most important ways to develop and support digitalization are: knowledge sharing, increased cooperation with other universities, following the new trends of society and education, improving the reward system of universities, supporting teachers in their competence development, increasing resources for teaching, team and group work and more integrated software. In the reward system, the main focus should be the rewarding of those teachers who have successfully utilized digitalized teaching methods and tools. The rewarding should also support the active teachers. Resources in this question meant time and money.

The organizational and governmental regulations and policies were not seen as important in developing digitalization within the organization.

One respondent felt that digitalization should not be included to the curriculum. The following facts were contributing to the process of digitalization within the organization: the health risks of digitalization, better ICT equipment, competence mapping of teachers, increased training and cooperation and development days and workshops (Figure 30).

Actions developing digitalization

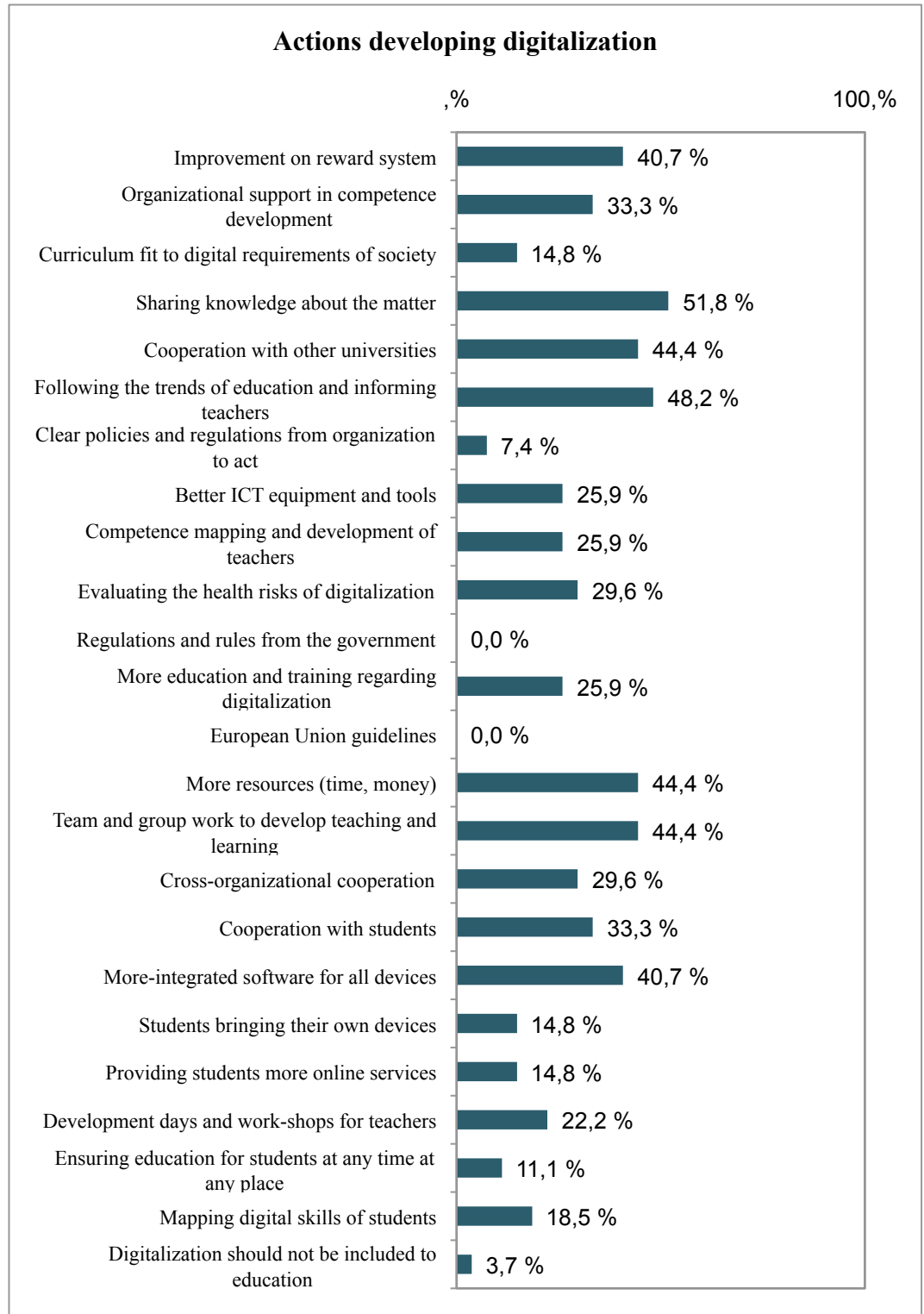| Action	%
Improvement on reward system	40,7 %
Organizational support in competence development	33,3 %
Curriculum fit to digital requirements of society	14,8 %
Sharing knowledge about the matter	51,8 %
Cooperation with other universities	44,4 %
Following the trends of education and informing teachers	48,2 %
Clear policies and regulations from organization to act	7,4 %
Better ICT equipment and tools	25,9 %
Competence mapping and development of teachers	25,9 %
Evaluating the health risks of digitalization	29,6 %
Regulations and rules from the government	0,0 %
More education and training regarding digitalization	25,9 %
European Union guidelines	0,0 %
More resources (time, money)	44,4 %
Team and group work to develop teaching and learning	44,4 %
Cross-organizational cooperation	29,6 %
Cooperation with students	33,3 %
More-integrated software for all devices	40,7 %
Students bringing their own devices	14,8 %
Providing students more online services	14,8 %
Development days and work-shops for teachers	22,2 %
Ensuring education for students at any time at any place	11,1 %
Mapping digital skills of students	18,5 %
Digitalization should not be included to education	3,7 %

Figure 30. Actions supporting digitalization of education

4.2.4   Dependencies

The most significant correlations between the variables are presented on this chapter.

According to the survey, the more work experience you have from other fields than teaching, the more frequently you participate in training. Figure 31 indicates the relationship between these two situations. Y-axis represents the times participating the training (1=more than ten times, 2= 5-10 times 3= under 5 times and 4=none) and X-axis the work experience from other field than teaching (1=none, 2=1-5 years etc.).
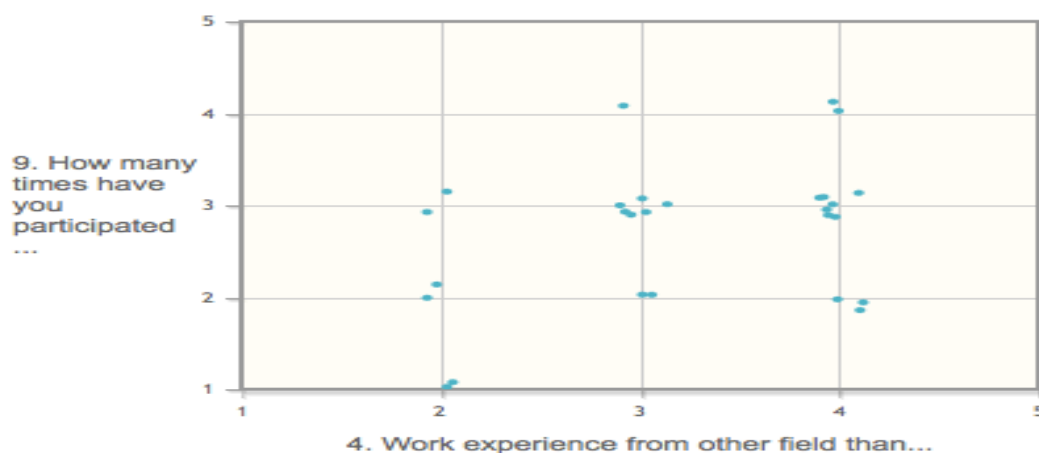

Figure 31. Correlation between participating in training and work experience from other field than teaching

The quality of teacher education does not influence the challenges that are based on the lack of time and organizing one's work. The Y-axis represents the evaluation of how well teacher education prepares the teachers for digitalization (1=very well, 2=some update required, 3=passable, 4=poorly). The X-axis points out the challenges to participating in training. (1=lack of resources, 2=lack of support of management, 3=lack of time, 4=lack of own interest, 5=the challenges of organizing own work, 6=other reasons) (Figure 32.).
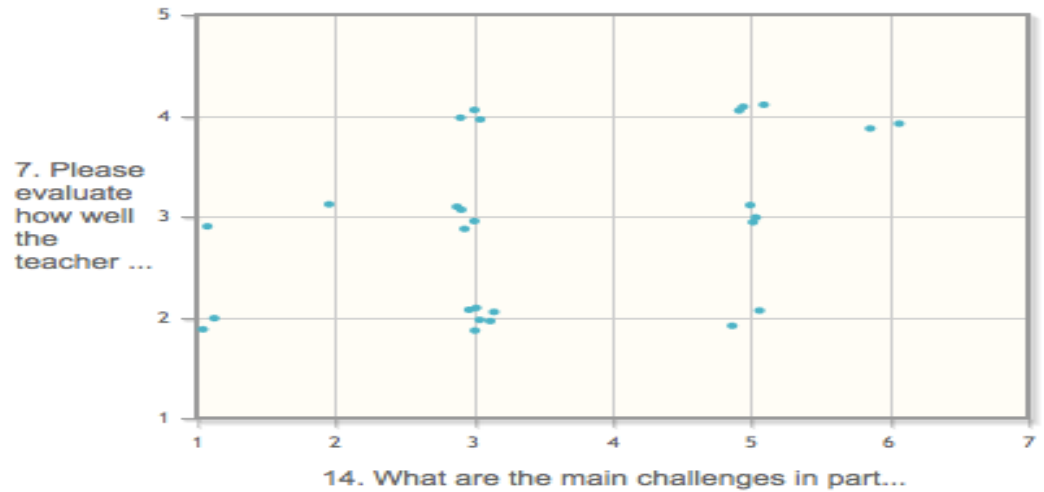
Figure 32. The quality of teacher education versus the challenges participating in training

According to the research, when the person feels him/herself competent enough, less training is required. The Y-axis represents the different digitalized teaching areas (1=create and edit material, 2=share resources in social bookmarking, etc.). The X-axis demonstrates the personal evaluation of one's own skills. (1=excellent, 2=good, etc.). The Figure 33. shows the correlation between these two questions:
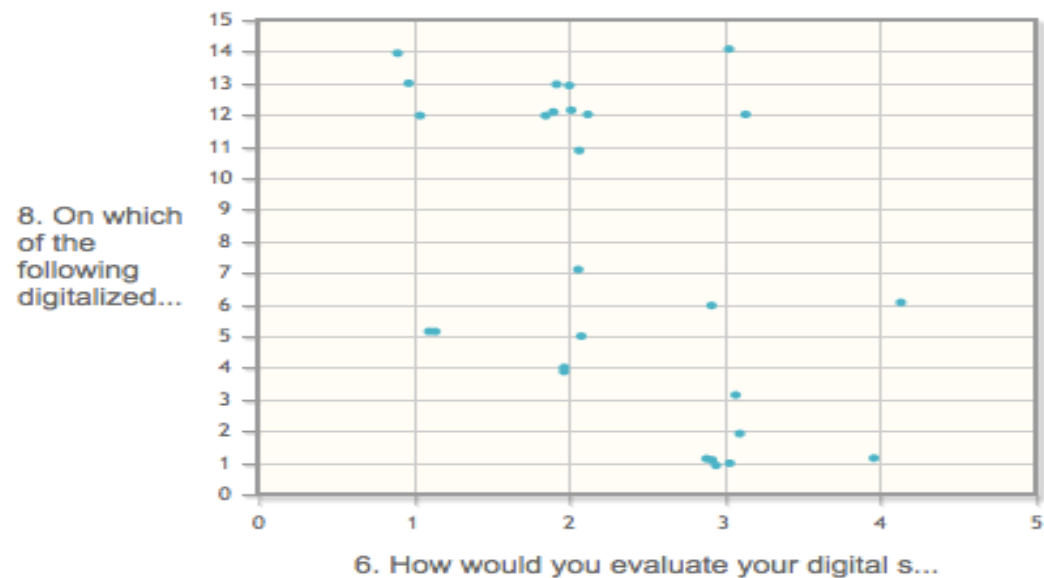

Figure 33. The correlation between digital training needs and the digital skills

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The challenges (lack of time, resources and difficulties to organize own work) are the same even though the teacher would perform different teaching methods. The Y-axis represents the challenges (1=lack of resources, 2=lack of support of management, 3=lack of time, 4=lack of own interest, 5=the challenges of organizing own work, 6=other reasons) and X–axis the different teaching methods (1=web based learning, 2=digital learning tools, 3=blended learning, etc.) (Figure 34.).
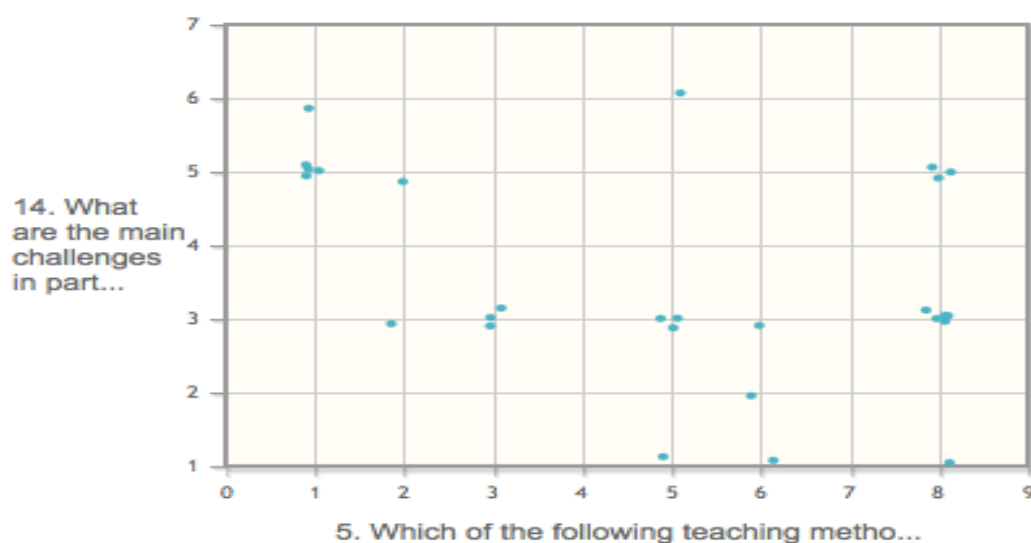
Figure 34. The correlation between participating in training and different teaching methods

4.2.5   Opinions and development ideas

At the end of the survey, the teachers could share their own thoughts about competence development, training needs and other ideas related to the topic. This section was compulsory, but the respondent could skip this question by just writing something into the empty space. These open comments are listed on the Appendix 5 and analyzed in Appendix 6. Next, some of the key points of are discussed.

Mainly, the respondents thought digitalization is important, positive and a current issue. Teachers felt that digitalization is inevitable. Some of the thoughts are mentioned here:

"Crucial topic"

"Important issue"

"Hard to resist"

Some of the teachers felt that the strategy should be implemented better into practice and the training should be more practical:

"Maybe some teacher training (kehittämispäivät) should be focused only on digital issues and really learning the how to, instead of always discussing strategy and future. Digitalization is the future and it is very practical. Even younger teachers are not familiar enough with all tools we have in our use. "

According to the teachers, digitalization would bring many positive side effects to the education:

"Brings more alternatives for studies both for students and teachers."

"Using different possibilities of digi devices is improving quality of teaching "

There were also comments criticizing the digitalization:

"Current hype words "

"It brings many advantages, but any thinking person should also be critical of it and understand that it may have some downsides"

"I just hope that there will still in the future be the opportunity to say: now close the screen down, ignore the computers and look up here & pay attention"

The respondents felt that disadvantages of digitalization should be taken into consideration. However, those who were critical towards digitalization thought that digitalization should anyway be included in the education. This was revealed

by the answers of previous question related to the actions developing digitalization within the organization.

One teacher emphasized the fact that the students may expect more digitalized studies than the university can offer. The needs of the students should be better met in the future. The students may be used to more digitalized education in their previous schools, so it can be challenging to meet the expectations.

Technology in LUAS should support digitalization. The teachers were hoping to have more unified systems and integrated devices.

> *"Different programs used by staff should be integrated in a way that there wouldn't exist any need to upload data more than ones."*

> *"Software should be the same on all devices incl. students and part-time teachers own device. Less different software to learn. Cloud-services very practical to use. "*

The equality of part time teachers should be improved in technical matters compared to other teachers. According one respondent the part time teachers are in different position:

> *"AD-passwords and part-time teacher's ability to access the intra should work longer than just the time of a course. "*

One respondent felt that self-development should be supported more, because otherwise there is not enough time to perform the daily work tasks:

> *"All time used for building new competencies is away from the acute daily routines. Organization does not really support self-development. "*

According to the open question, the answers were grouped and categorized into technical, motivational, societal and educational themes. The themes and thoughts are listed in Table 6:

Table 6. Open comments towards digitalization

Technical	Motivation	Societal	Education
• Unified systems • Integrated devices • User friendliness • Accessibility • Cloud services • Equality of different teachers	• Self development • Practical training • Focused theme days • Cooperation • Support • Importance • Support and resources	• Health risks • Social problems • Globalization • Ethics • Changes in human behaviour	• Variation • New learning possibilities • Increased quality of teaching • Expectations of students • Existing skills of students

4.2.6 Limitations and errors

The survey was sent in English, so this may have influenced the amount of replies. The lack of interest to the topic or the timing of the survey to the beginning of semester may have influenced the response rate. The respondents in this survey may have more positive attitudes towards digitalization because the survey was conducted by a web-based tool. This may have influenced the replies.

The different faculties could have been compared based on the research results and what kind of attitudes different faculties have towards digitalization. However, the author decided not to categorize the results between various faculties and the"faculty" question was left out. There was also error in the question concerning the actions developing digitalization, because the organizational policies and structures were mentioned twice. However, it did not influence on the results.

The digital courses could have been listed, what kind of courses the teachers participate in so it could have been interpreted. It would have been also useful to know when the teachers have received their Master's degree. By this way, the different backgrounds of teachers could have been compared better.

The evaluation of digital skills was based on the respondent's own opinion. The respondent may overestimate her or his skills. Hereby, the respondent may not have a clear picture of his or her abilities.

The presentation of different questions should have been reformulated. The additional interviews would have supported the research process, but due to the time limit this was not done.

There were only three teachers, who gave their contact details for further interviewing. Due to the low number of volunteers, the researcher decided to leave the additional interviews out.

4.3   Cross-analysis

After completion of all research methods, the results of the empirical part are combined and compared. The findings are presented and the author will give some recommendations based on the theoretical part, preliminary interviews and the competence development survey.

The interviews and competence development survey confirmed that digitalization is a current issue, which needs to be taken into account in LUAS. The training of digital skills needs to be considered in LUAS human resource department. According to the preliminary interviews, the management of LUAS felt that the teachers would require changes in the reward policies in order to participate in training and increase motivation towards digitalization. Based on the competence development survey, the teachers require more support from the organization in order to participate on training. Even if the management is supporting the competence development at the moment, the organizational support should be still emphasized in form of time and resources for organizing own work. The third main issue in participating in training was the lack of resources. Most of the teachers felt that the self-development should be supported more, so that the teachers could learn digital skills. The most suitable learning method would be combined learning, but there were lot of variation in the opinions.

At the moment, the teachers do not have time for training and developing themselves. The teachers do not have opportunities to organize their work so that they could participate in training. 51, 8 % of the respondents evaluated that they have reasonable possibilities to participate in training. The majority of the respondents 55, 6 %, evaluated that they have participated in training under 5

times during their career. The teachers were hoping to have more resources for training like time, rewarding, training possibilities and financial resources. In contrast, the management would like to increase the cost-efficiency, competitiveness and performance of the processes.

The knowledge of the importance of digitalization should be added in order to increase the motivation to learn. According to the competence development survey, the teachers felt the change towards digitalization mainly positive. Also the management emphasized the importance of information sharing. The communication and feedback should be increased. The negative influences of digitalization should be also taken into account.

According to the future vision of LUAS management, the teachers should offer more support to the students in digital learning environments. The teachers are required to offer different digital learning opportunities to the students. In respect to the survey, the teachers require special training in evaluating student performance in digital learning environments (61, 5 %), creating and editing digital material (53, 9 %) and using different classroom technologies (61, 5 %). Besides these three areas, the teachers would feel it beneficial to find and use different learning tools (46, 1 %). At the moment, the competencies of the teachers requires updating in order to support the strategic vision of providing digital education.

The main arranger of the training should be the own organization, as 77, 8 % of the respondents in the survey stated. This shows that the own workplace is in an important role, when offering development possibilities to their workforce. When it comes to the interviews with the LUAS management, the teachers' self-development should be enabled via participating in different communities, development days and project groups etc. The management emphasized the teacher's own initiative and interest in training and digitalization. The teachers on the other hand were hoping for more training possibilities, practical ways to learn and discuss about the digitalized strategy.

The teachers evaluated their own digital skills in the competence development survey. Over 42 % of the respondents felt that the skills are good and 19, 2 %

evaluated their skills as excellent. When correlating the answers to the digital competence development needs, the respondents who thought their skills are excellent did not feel the additional training would be needed in large scale. The evaluation of digital skills was based on own personal opinion, so this may influence on the training needs. The own skills may be overestimated.

Interestingly, the teaching method does not seem to influence the workload of the teachers. Even if it has been said that the digitalization would bring more flexibility to the teachers, there is no difference between the teachers preferring different teaching methods and the teachers favoring the physical contact lectures. All teachers are suffering from the lack of resources, time, workload and possibilities to organize their own work.

The physical contact lectures and learning through projects are the most popular teaching methods at the moment. It seems that the transition into digitalized learning and teaching is still lagging behind the development of society and the vision of the organization. The teachers still prefer more traditional learning methods. The teachers were hoping improvement in university's reward system, so that the active teachers in digitalization would be appraised. The achievements and good practices should be shared more efficiently.

According to preliminary interviews, clear policies and rules are important. When it comes to organizational policies and regulations, the teachers do not consider them so important. The teachers require mostly support and resources for their main work from the organization. Both interviews and survey emphasized the fact that knowledge should be shared more intensively. Cooperation with other universities, cross-organizational cooperation, cooperation with students and team as well group work are the most important ways to develop the digitalized education.

The respondents of the competence development survey evaluated that the most important reasons for competence development were their own development needs, improving the quality of teaching and the needs of the students. The personal development and the students are the motivational factors that influence

the willingness to participate in training. The teachers become more motivated, when the students' study results will improve.

Based on the competence development survey, digitalization is not sufficiently included in teacher education. Additional training is required. However, the barriers to training were mainly organizational, not connected to the teacher education. In the future, teacher education should make some adjustments in order to meet the requirements of society and the organizations the teachers are working in. The questionnaire was missing the question of how many years the teachers had from their graduation. Teacher education may have changed since then. However, the main responsibility in the teacher training is in the hands of the organizations where the teachers work.

The research showed, that the more experience you have from other occupations, the more you participate in training in LUAS concerning your digital skills. This can be motivational factor that people tend to develop themselves more in good work environment. The other reason can be that the person may require more pedagogic content skills when transferring to work in LUAS from another workplace. The requirements in other workplaces can differ from the LUAS work environment. In the recruitment phase, the required skills should be emphasized more. All in all, the competence development of teachers should continue in the workplace and additional training should be offered according the individual's own development needs.

The problem related to organizing one's own work and time problem can be solved by offering training during work time, so that the teacher could concentrate some hours during the month or year to self-development. However, the resources should be allocated differently than at the moment, because the teacher cannot perform course planning, teaching or guiding the students during their own learning process. Some of the digitalized learning tools, cooperation with other teachers or universities or project-based learning activities could help teacher on organizing their own work. Also the organizational cooperation would help teachers to divide some of their tasks, so that they could concentrate more on development of their competencies. The work descriptions were also mentioned in

preliminary surveys, so that it would be beneficial to think the whole process together in the organization.

When the knowledge and training in digitalization is increased, the individual becomes more confident in using digital skills. The positive attitude towards learning new things helps to internalize matters. Digitalization will be part of the education in the future, so it should be taken account in organizational training.

Next, the author will give some development proposals based on the background interviews, competence development survey, the theory and own perceptions. The recommendations are divided into the following categories: strategic, human resources, organization,education and teacher education. These actions help to build the digital identity of teachers and support their well-being. The proposals help to build the digital identity of organizational culture and change the attitudes towards digitalized education. In Figure 35, the recommendations are compiled:
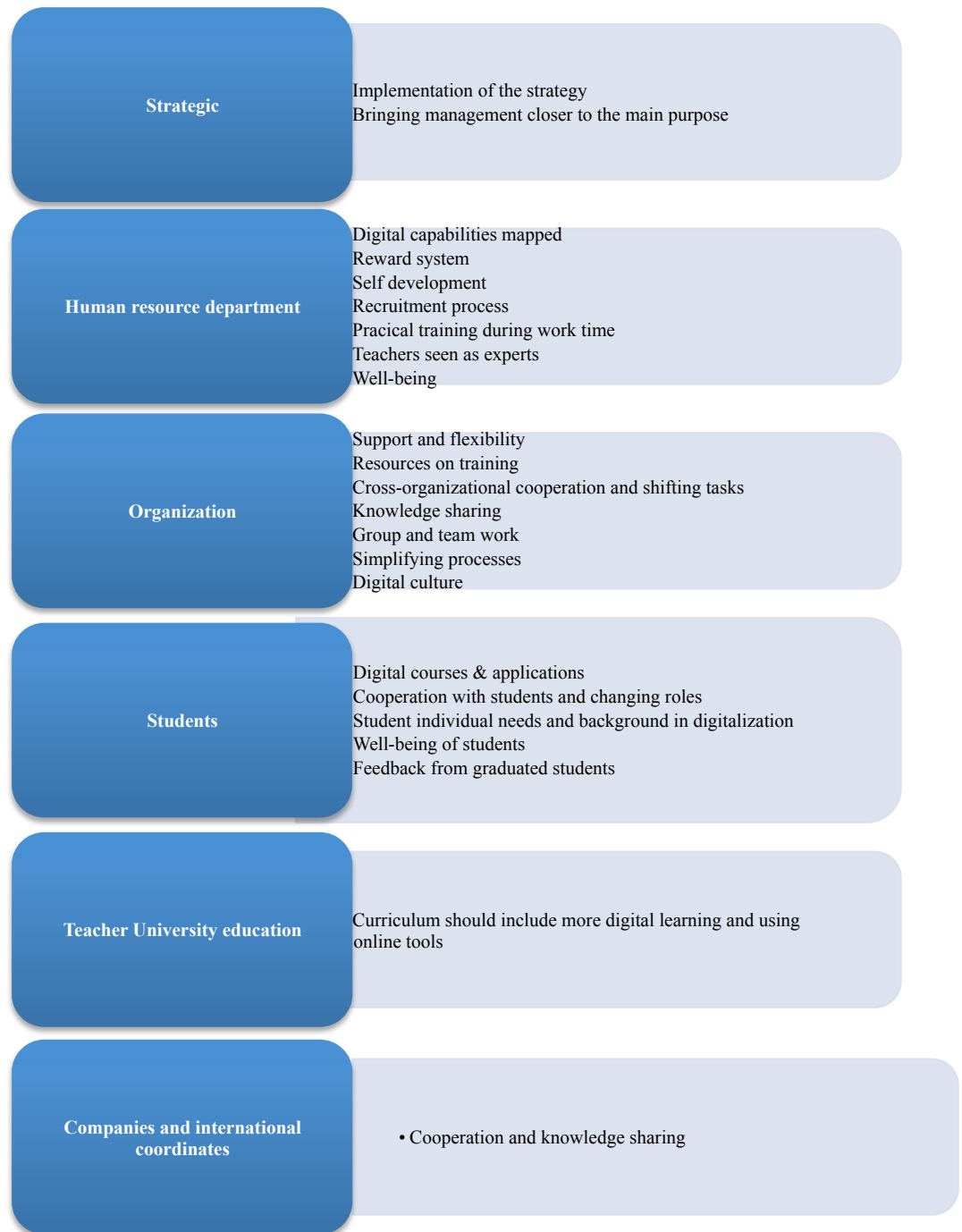
Strategic

Implementation of the strategy
Bringing management closer to the main purpose

Human resource department

Digital capabilities mapped
Reward system
Self development
Recruitment process
Pracical training during work time
Teachers seen as experts
Well-being

Organization

Support and flexibility
Resources on training
Cross-organizational cooperation and shifting tasks
Knowledge sharing
Group and team work
Simplifying processes
Digital culture

Students

Digital courses & applications
Cooperation with students and changing roles
Student individual needs and background in digitalization
Well-being of students
Feedback from graduated students

Teacher University education

Curriculum should include more digital learning and using online tools

Companies and international coordinates

• Cooperation and knowledge sharing

Figure 35. Recommendations for increasing digitalization in education

Strategic

1. Implementing the strategy
2. Bringing the management closer to the core processes

According to the competence development survey and the background interviews with the management, the strategic objectives should be communicated better when it comes to digitalization and new learning environments. On the other hand, the management should understand the core processes of the organization in order to develop the activities. The needs of the students, companies of Lahti region and society need to be taken into account. Increased cooperation and feedback gathering for instance from graduated students and local companies would be important. The management should get familiar on the daily processes.

Human resources

3. Digital literacy of teaches measured

The digital literacy skills of the teachers should be measured. After evaluating what kind of skills are lacking, the human resource department can design the individual training needs. If some of the skills are missing, they can be one criteria when starting recruitment process. Digital literacy skills could be mapped for instance with affinity diagram, where the participants can write down tasks in small pieces of paper, find similarities and organize them into groups. The groups can be named. (Savonen 2014) With the help of this information, the competence map can be defined for digital literacy of teachers.

4. Reward system supporting digitally active teachers

The teachers that are keen on developing their courses with the help of technology, should be appraised and they should be rewarded. Kaplan and Norton (2002) mentioned, that the motivation of employees is connected to rewarding.

The rewarding can be, for instance, acknowledgment of good work, monetary or other reward.

5. Self-development actively followed

Kaplan and Norton (2002, 234-297) mentioned, that the Balanced Scorecard model can help the employees to follow their self-development. The teachers should be able to follow their self-development and progress in real time.

6. Recruitment process

As mentioned earlier, the mapping of the digital literacy and core competencies of teachers more specifically will help in the recruitment process of new employees.

7. Practical training during work time & mentors

The teachers have problems in organizing their own work, because they do not have substitutes. The practical training during the work time could help the teachers to develop their skills. This demands flexibility from the organization. The organization should reserve more time for teachers' self-development, but this should not increase their workload. The other employees from the organization could help on this matter by mentoring the teachers in practice.

8. Teachers seen as experts

The teachers should be offered more time in guiding the students. The teachers are the closest to the students in the organization and they have years of experience of teaching. The experience and skills of the teachers is a great resource. It should be valued and their opinions and feedback should be appreciated.

9. Well-being

Even though the digitalization is an important issue, the counter sides of it have to be measured and evaluated. There are some health risks and social problems that need to be considered. The health risks could be prevented by for instance by supporting the sports activities of teachers as Hänninen, Huttunen, Ekman & Koskelo (2011, 97-102.) propose. The health care of teachers should be well organized. The teachers need the skills to identify these problems in the students and know how to direct the student to special councelling.

Organization

10. Support and flexibility

The teachers require support in their self-development, but also in designing courses with digital tools. The traditional roles of employees and work tasks need to be changed.

11. Resources on training

The teachers require more resources in training; time and motivation. In this way, the quality of teaching can be maintained and the motivation of the employees can be increased.

12. Cross-organizational cooperation and shifting tasks

13. Knowledge sharing

14. Team and group work

According to the survey, the teachers are not able to participate in training due to workload and difficulties to organize their work. The e-learning technologies

require time for editing, cutting and compiling of the material to the web. If the teachers will do all the work related web-based activities, they will not have time to students and teaching.

In order to decrease the workload of teachers, one option could be hiring new employees to perform the extra tasks. The other employees in the organization may also be more familiar with the technology, so they could help the teachers by sharing knowledge and working as mentors. The knowledge sharing can happen in mixed groups and the employees can learn from each other. The learning can also happen when following what others do. This helps to share thoughts and enables creation of new innovative ideas. The increased awareness helps the teachers to change their mental models and also gain personal mastery from digitalization.

15. Creation of digital organizational culture

The organizational culture should support digitalization. The change must be comprehensive and the processess, devices and software should support digitalization. The teachers should be offered tools and operational environment that enable development of one's digital competencies. The old structures need to be understood and the organization's cultural change should be supported by increased knowledge sharing and cooperation.

Education

16. Digital courses & applications

17. Cooperation with students & changing roles

The one way of sharing knowledge about digitalization would be to learn from the students. As discussed earlier, the students may have different digital backgrounds. Some of them are very fluent in using technology. The students are confident on using digital tools and the teachers have the pedagogic knowledge,

so this knowledge base could be combined. The changing of the parts between students and teachers would provide new aspects. By increasing the digital courses and applications, the students and teachers could interact and understand each other better.

18. Student individual needs and background in digitalization

Every student is an individual so they also personal strategy in their lives. When they enter the school, they have their own expectations and objectives. There may be different reasons why they are studying and what kind of aims they have in their personal life. Their background is influencing on their skills and their ways to study and learn. The students may come from different cultures and they may have various degrees already. Some of the students have already experience from work life. The life experiences,the upbringing, norms and ethics have also influence on the personality of the student. The students personality should be taken into account when creating digitalized learning options.

The school could create student profiles in order to respond to the needs of every individual. The students should be offered more individual service based on their competencies. The leap from the institutions to the universities can be too big for the students and they may require more assistance to perform tasks individually. However, it would be a good thing to examine the skills of the students in order to create more individual service and offer e-learning.

19. Well-being of students

The well-being of students is also important in a digitalized learning environment. The isolation and social problems may occur, if there are no physical contact lectures. The social skills are essential in life, so it is responsibility of education to help students to learn ways to communicate with different people from different cultures. There are students with different learning disabilities, so they may require more support from school. Also mental problems of students can be a problem, increased digitalization can increase loneliness of students. These facts

should be considered when creating curriculum, student profiliating and providing student health care.

20. Feedback from the graduated students

The students who have been already graduated can be a great resource. They can provide feedback on the studies and it can be utilized in the development of degree programmes.

Teacher education

21. Changes in teacher education

According to the preliminary interview, the theory and the competence mapping survey, the skills of the teachers in digitalization require development. The teacher education should included more digitalized courses and competence development in order to meet the requirements of work life, students and society.

Outside cooperation

22. Cooperating with local companies and international coordinates

The feedback and communication with other universities and local companies should be increased.

4.4 Research question conclusions

In this section, the research findings are concluded with the research questions.

RQ1: What are the key factors influencing on the individual's digital competence development?

According to the theoretical part, interviews and the survey, the motivation is the most important fact influencing the individuals' competence development. As Senge (1990; 7-9) has stated, the change of our mental models is the key to organizational learning. The learner needs to have awareness of his or her way of thinking. The person's own values and beliefs on combining the new information with existing knowledge (Koponen 2008, 14-15). By recognizing the individual's mental models, the existing patterns can be changed. In organizations, the organizational culture influences on adapting the changes and learning (Russel-Jones 1995). Certain processes and ways of working may influence on the changing the existing structures. According to the survey, the motivation of the teachers was connected to their personal development needs but also meeting the needs of the students and improving the quality of teaching.

The teachers in the survey had different opinions towards digitalization. According to the background section of the survey, the teachers preferred different learning methods in teaching. The teachers also had different work background. Some of the teachers had been working in LUAS for a long time and others were newcomers. The values and existing know-how influence on the way the teachers teach and utilize their present skills. The survey also showed that one third of the teachers felt that the teacher education in the universities gives good prerequisites to providing digital education. However, rest of the respondents thought that the teacher education gives only fair or poor skills to utilize digitalization in education.

The culture we live influences on the way we learn (Bates & Sangra 2011; Koole 2009; Ojanen 2009). When we have awareness of different cultures, we can understand different learners. There were also teachers from different nationalities. The cultural backgrounds of the teachers influence their behavior. The teachers may have studied abroad and they have different kinds of education. All of the interviewed teachers had been working in other organizations, so they have obtained skills and information from these previous workplaces. The teachers were in different positions, so they have had different career paths than the others. The education, culture and the earlier learning experiences influence the competencies the teacher has.

The individual has to have own ambition to learn. The individual needs a determined objective, which drives his or her actions. The person can have own personal goals, but the organizational strategy must support that objective. According to the survey, over 74 % of teachers felt motivated to follow their personal development. The other reason to apply for training was to improve the quality of teaching. Over 64 % of teachers felt that the needs of the students were an important reason to apply for training.

The respondents considered that the support from the organization could help them in their competence development. The support from the organization can be divided into two sections: time and motivational factors. At the moment, the teachers do not have time to participate in training. They do not have resources to organize their work. The teachers also hoped for improvements in the organization's reward system, because that would also increase their motivation to learn. The personal development should be actively followed and appraised. Still, the teachers felt they had at least reasonable possibilities to participate on training.

According to the survey, the teachers felt it problematic to evaluate student performance in digitalized learning environments and use different classroom technologies even if they felt they had good technical skills. The problem can be in existing tools or support from the organization, because the teachers evaluated their skills were good or excellent. However, the evaluation of own skills can be difficult and this is the reason why the own performance should be easy to follow.

As mentioned in the theoretical part, learning will change the way person thinks and learning can happen in different learning environments. Technology is just one tool in the learning process. (Koponen 2008, 14-15.) However, technology and the outside environment may determine what should be learned (Ally 2008, 20). The respondents to the survey felt that the most suitable training method would be combined learning, partly individually, partly participating in lectures and using different learning methods. However, all of the learning methods received votes, so the method depends from the person's needs, opportunities and existing know-how. The organizational support is also essential when selecting various ways for training. The unified systems, devices and software could support the learning process and increase the accessibility of devices. According

to Koponen (2008, 15) the learner can combine different tools and learning environments in the learning process. Mobile learning and e-learning happens, when the device or technology interacts, accesses and communicates with the learner (Koole 2009, 27; Koponen 2008, 15). The success of the learning process is attached to the learner and the outside forces supplement the process.

The digital skills of the teachers can be developed, when the prerequisites to learning exist. The outside environment, learning methods, trends, culture and different learning tools influence the learning process. Learning is a continuous process and it is described in Figure 36:
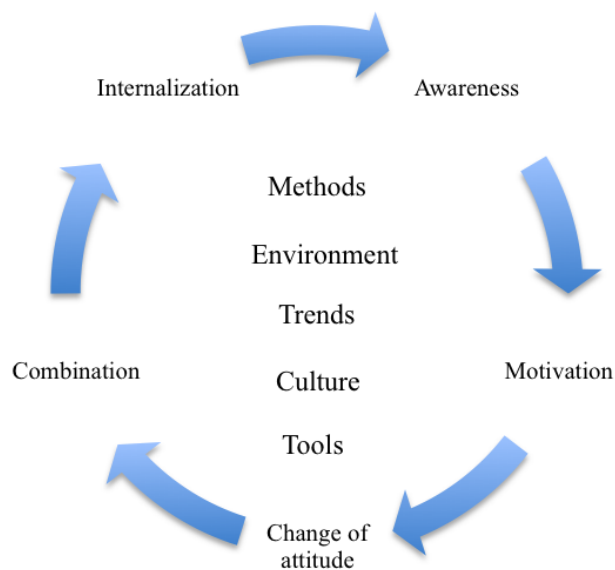

Figure 36.Continuous cycle of learning (Koskinen)

The model of digital learning and learning environments can be utilized in the digital competence development within organizations and it can be adapted also to the students.

RQ2: What are the main challenges the LUAS teachers are facing in their digital competence?

According to the survey, the LUAS teachers and employees emphasized that the digitalization was an important and strategic issue. However, according to the open comment section, the teachers felt they would need more concrete ways to utilize digitalization in teaching and digitalization should be emphasized more. In addition, the respondents were hoping that the digitalization would be identified from the management level. Most of the respondents felt that the competence development will influence the quality of teaching. The competencies that especially required improvement were: evaluating student performance in digital learning environments 59, 3 %, using classroom technologies 63 % and creating and editing digital material 55, 6 %. These skills are essential to provide digital education; especially the performance evaluation is one of the core tasks of the teachers. The core tasks of teachers work should be understood in order to provide effective support on this core process.

Based on the LUAS strategy, the new learning environments and entrepreneurial learning should be part of teaching. When it comes to entrepreneurial learning method and ability to use different learning technologies, they are not widely used among the teachers. An interpretation of this is that the implementation of the future vision needs to be recommunicated. The awareness of the strategic objectives should be increased among the teachers and practical implementation tools should be offered.

When the amount of training and awareness is systematically increased, it will also have a positive influence on the study results and the well-being of students. The teachers become more comfortable in using technology and they feel more appreciated.

There are some barriers to change during the process of digital competence development of teachers based on the survey. There are several trends influencing education on the same time, so this can influence the capacity of teachers to respond to the new trends. The overload of information can affect the teachers'

ability to be receptive in new ideas. The workload of the teachers is high, so it can also affect the capacity to learn.

Organizational support was essential theme during the survey and it was mentioned in the form of flexibility, time and resources to training, motivational factors and implementation of digitalization into practice. The existing ICT technology should support the change. The motivation of the individuals will increase when they receive support from their organization. The teachers hoped ways to organize their work in order to participate on training. The choice of teaching method did not influence on the time and resource factors. The workload is same for all teachers, regardless the teaching method they select. The strategic objectives should be implemented into practice in order to increase the awareness, motivation and change of mental models. The achievements should be communicated and rewarded.

The change of existing mental models is essential. The awareness of own skills helps to develop the existing know-how. Some of the respondents considered that their skills were already adequate and this may also reflect their willingness to participate on training. Acknowledging own weaknesses is essential when avoiding overestimation of own skills. The new knowledge can remove totally the old knowledge or support the old skills. The mentors can help in the change process to encourage people to change and adapt new information. The increasing the knowledge sharing of the matter will help in changing the existing opinions.

The last problem is internationalization, to implement and utilize the new knowledge into practice. It is important that the individual feels confident in using the new skills. The individual should internalize the strategic objectives so that the organizational and personal goals can be merged. The barriers are listed on Table 7:

Table 7. The barriers of digital competence development

Organizational & Individual	Barrier	Description
	Awareness	Understanding the importance of digitalization in education, acknowledging own skills and weaknesses, awareness of different backgrounds, cultures
	Motivation	Interest and ambition on develop own skills, participation on training
	Capacity	The resources to adapt new information to avoid burnouts (workload, constant information flow)
	Support	Time and resources for organizing own work Time and resources for participating training Strategic goals into practice-providing more education to the teachers Motivational factors from organization (lack of rewarding, achievement notification)
	Change of mental models	Support the change in individual's existing beliefs, values and know-how(Positive attitude) To avoid overestimation of own skills Mentors Knowledge sharing
	Internalization	Ability to utilize new knowledge into practice, feeling confident with the new knowledge, understanding the strategic importance of digitalization

> *RQ3: How the digital skills of the teachers should be developed in order to improve the quality of education in LUAS?*

The emphasis on strategic importance of digitalization and continuous training will influence on the motivation. Consequently, the teachers will become more committed on the organization and this will be advantage for the organization too. As discussed earlier (Trow 2002, 309-311), the universities are competing for qualified workforce. The skilled workforce helps to improve the quality of

teaching and the commitment influences on the satisfaction for existing workplace. The training opportunities need to be provided in order to support the self-development of teachers. The competencies of teachers are reflected to the students. The organization is in charge of providing training opportunities to the teachers.

The EFQM-model and Radar logic (EFQM 2012) were introduced earlier in this thesis in chapter 2.2. It will be used here to create the development model to supplement the change process required in LUAS. The change process will also help to support the change of the whole organizational culture towards digitalization and helps to develop the quality of education.

First of all, LUAS should identify the importance of digital competence training. When it comes to LUAS strategy (LAMK 2015), the competencies of employees are one important objective. At the moment, the teachers cannot be involved in continuous learning process due resource problems. There are different trends influencing on the operational environment of the universities on the same time, so these trends have to be evaluated and prioritized in order to develop effective practices for the human resource development. Sufficient communication and information sharing on individual, group and team level can help to increase the awareness of required change. The acknowledgement of need of change in old values, beliefs and organizational culture is necessary in the change process. The organization must understand the way the individual learns and after that, support the learning process with different actions.

Secondly, the implementation of strategy needs to be reconsidered. The motivational factors of the employees need to be understood by the management. The work processes need to be simplified in releasing the resources into organizational learning and also relieve the workload of the teachers. Decreasing the bureaucracy, combining different development themes and listing the processes that are necessary for producing added value to the students would help teachers to feel that their skills are adequate. The work descriptions and identification of core process can be helpful. The reorganization helps to concentrate on important issues. The organizational flexibility should be increased

so that there are more possibilities to participate on training. The communication and feedback on this stage is also important.

Thirdly, the motivation of the teachers is important. The employees should stay motivated during the whole process. The organization should provide environment, where the individuals are encouraged to critical thinking and given autonomy to act. All kind of feedback is appreciated and errors are accepted in learning process. The sharing the knowledge by different project groups, mixed groups and cross-organizational cooperation can be worthwhile. Setting personal, team and common goals is important. The strategic objectives, training needs and personal development should be easy to follow with special targets. The teachers implementing successfully the strategy into practice, should be awarded. The personal targets could be located for instance in web-based software, where the points and goals could be followed. Nevertheless, everyone should be able to use the personal progress software, so it should be simple and clear. During the motivation process, it is crucial to understand that people have different backgrounds and that they need different kind of coaching. The capacity and well-being of the teachers should be followed in order to avoid depression and burnouts.

Fourthly, the training process can include tailor-made solutions based on the individual, team or common goals. The participative learning methods and collaborative learning can help to internalize the matters, when the comments and thoughts are shared within group. The mentor can help on this stage to provide support and advises. The mentor can also work as an example, so that the learner can follow what the mentor is doing and learn by observing. As mentioned earlier, there are already some teachers who have been innovators and successful utilizing the new teaching methods. These innovators have the knowledge and enthusiasm to share their knowledge with others. The practical training or so called learning by doing is one example of training models that could work here. The students can provide valuable ideas on the training process if the training is realized in the actual learning environment. The digital learning environment, methods and tools should be used here.

When the training is over, the fifth important stage in the development process is the internalization. The new way of working is put into practice and the person has the ability to change the explicit knowledge into tacit knowledge as Nonaka, Konno & Toyama (2001, 14) have explained about internalization of knowledge. The cooperation with students on this stage can help to combine the pedagogic content skills with the new digital content skills. The students should be participating on using the digital learning tools and work in digital environment. The new ideas and innovations can be created in order to respond better to the future challenges of education. The pedagogical skills are combined with the new skills.

Finally, the process should be evaluated in order to see what the results are and what has been learned. The evaluation helps to develop the process in the future. The feedback on this section can be obtained from the external shareholders of the LUAS. These shareholders are the students, companies in LUAS region, government or other external coordinates. The graduated students that are in the work-life can provide valuable information to develop the education. According to the competence development survey, the teachers feel that the quality of the teaching and the needs of the students are connected to the teachers' motivation to learn. The internal feedback is also essential, because the teachers can evaluate if the process has been helpful for them. The evaluation can be done personally or in groups based on the individual or common targets set earlier. The change agents, mentors or other people in the team can provide the feedback. The quality assurance should be happened regularly and the feedback should be interpreted impartially.

During the whole process, the leaders will act exemplary and they will motivate the employees. The support is provided to the individuals and teams. The communication and feedback is constantly shared. The cross-organizational cooperation is utilized in the development process so that the experiences can be shared in groups. The cooperation with other universities is utilized in the training, development and evaluation process. The development process is described in Figure 37:

Figure 37. The development process of digital competencies and culture of LUAS
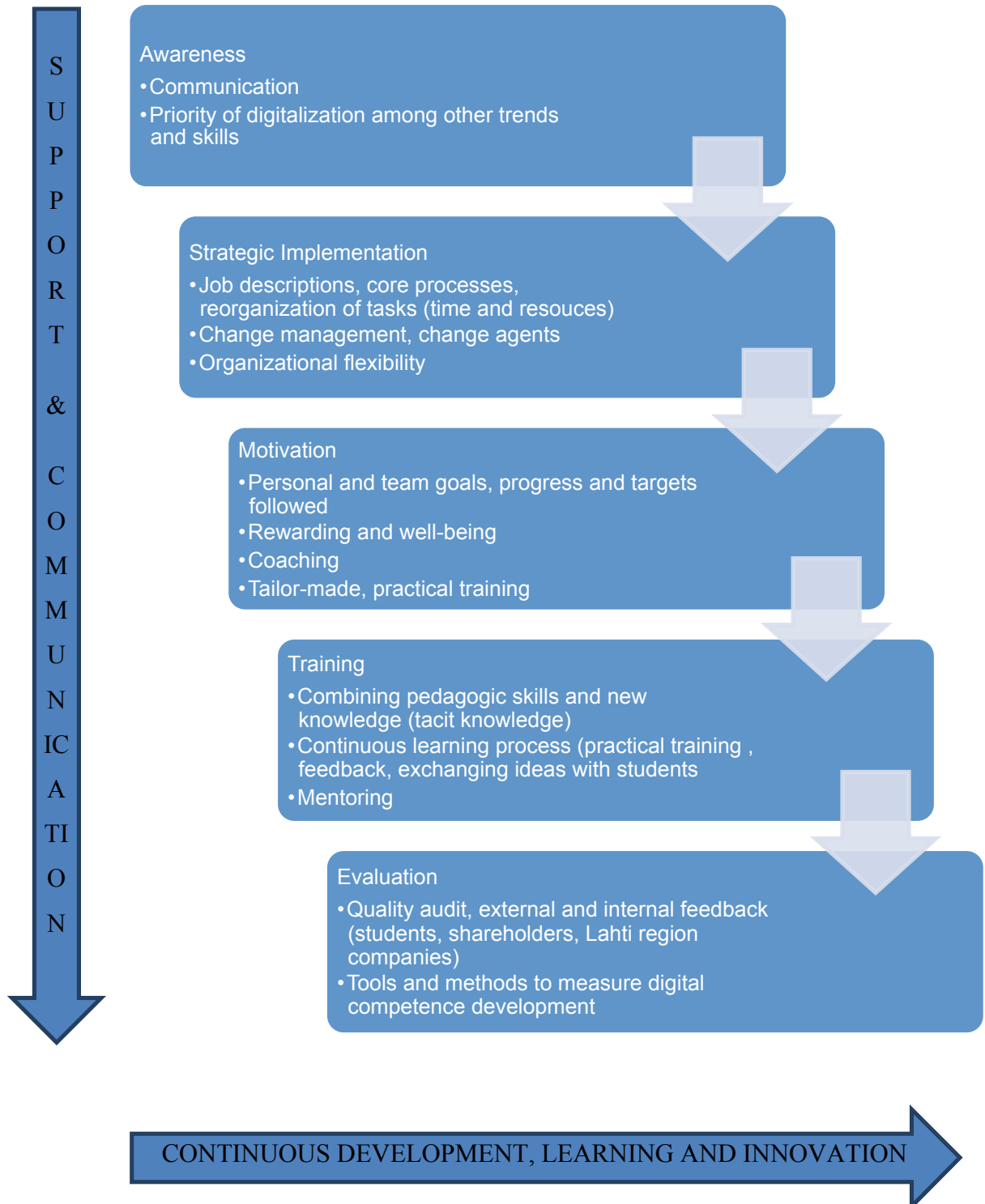
As mentioned in EFQM-model (2012), the results of this improvement process can be seen in employees, customers, society and business. When the digital competencies of the teachers are improved, the quality of education will improve.

The continuous learning process of the teachers is supported. This will lead to satisfied students, who will use their knowledge and skills behalf of the society and business. The research and development activities of the university will also improve and new knowledge is created for the use of society. The image and reputation of LUAS will improve because the students and companies in Lahti region are satisfied. The LUAS will gain competitive advantage against its competitors. LUAS will also become more popular among the students and partners. The development process will lead to better business results and performance. The new trends can be forecasted when the new knowledge is actively shared and the environment becomes more reactive for new innovations.

5   CONCLUSIONS

The aim of this thesis was to find out how the digitalized competencies of teachers should be developed in order to improve the quality of education. On this chapter, the research findings are discussed and reflected to the research questions. Secondly, the research validity and reliability are considered. Thirdly, the further study ideas are proposed. At the end, the improvement suggestions and conclusions are presented.

5.1   Discussions and reflections

Digitalization is quite new concept in education. However, it is part of our everyday life and it should be combined to the education.

The new strategy of LUAS takes into account the new trends of education, like digitalization. The well-being and growth of the employees is one of strategic objectives, alongside with providing"insightful learning experiences" (LAMK 2015). On the same time, the performance of the organization should be improved and different ways to find cost benefits are investigated. Concurrently, the study results should be also improved in order to compete in international and national rankings. The teachers on the other hand, are required continuously to develop their skills to maintain the up-to-date information and quality of education.

According to the theory and research, the implementation of the strategy in falls behind of the written objective. The teachers require more information and practical training to develop their skills. By strengthening the support from the organization and concluding a development process to improve the digital competence development training, the LUAS can gain competitive advantage against other universities. The trends of the education, like digitalization should be emphasized more in marketing the studies to students. The special requirements of different students should be taken into account better, so that the students feel they are appreciated and they are part of the organization.

The interviews, participation on different seminars and the research gave the author various perspectives of the trends influencing the education, the strategic objectives, the processes that should be developed, the financing and needs of the

teachers and other employees. The author is a student in the organization, so this gave author interesting setting to see the university from two angles: the organization's and student's point of view. The new trends, like digitalization can make the organization "blind" so that there is eagerness to change and develop the existing structures too fast. Actually, the university should keep in mind the main purpose of the organization during the whole process and plan the process carefully. The old saying:"Half begun, is half done" can be also reflected to this process in LUAS. When changing existing structures, LUAS requires a clear plan and listening the needs of the employees, the students and companies at Lahti region. The research has shown the importance of digital competence development of teachers. The personal and team goals should be set. The achievements should be followed and rewarded.

Nevertheless, the technology can influence negatively to ourselves and the social interaction has been already changed. One respondent of the survey emphasized the social factor of digitalization and recommended to think how these devices influence on our brains. Digitalization is inescapable, but we need to be also aware of its disadvantages.

5.2   Validity and reliability

This Master's thesis is founded on quantitative and qualitative research methods and the theoretical framework supports empirical part. By exploiting three different methods in data collection, validity of this work is increased.

In the empirical part the methods are reliable. The research can be repeated, though the sampling of the data can influence on the reliability. The humanity influences on the quality of data, because the values, beliefs and external factors effect on the responses. The interpretation of the researcher can also influence on the reliability.

The competence development survey was conducted only in English, so the language barriers may have influenced on the amount of respondents. The participation of the survey was totally optional. If the research would be redone, the amount of respondents could increase or decrease. Some generalizations in the

answers were performed. 12 % of the teachers replied to the survey and their views were reflected in data analysis. The quality of the competence development survey was good, even though there were some spelling mistakes and couple of errors. If the research would be performed again, the researcher would more background questions in order to understand how different backgrounds and values influence on the training needs. For instance, the faculty, the year of graduation from teacher's university and listing the different courses related to digitalization would be beneficial. Also a separate question for measuring clearly opinions about the digitalization could be included. However, the attitudes were figured out from other question connected to organizational actions towards digitalization.

In the end of the survey, there were no comments related to the quality of the research. There were respondents from different occupational levels, so the sample was diverse.

The various data collection methods, like articles, other researches and literature supported the empirical part and also provided good groundwork for finding answers to the research questions.

5.3   Future study

The digital competencies are required in the society, so the competencies of students and the employees should be investigated more. The organizational learning process can be evaluated by utilizing the methods represented in the chapter 5.4. After all, the learning process we all face in our lives remains the same even though the environment and requirements may change.

Further study is proposed to creating indicators for the individual's digital competence needs so that the evaluation of the skills would become easier.

The employee requirements for the support and the motivation should be defined in order to increase the success of the competence development process and commitment.

Digitalization is quite new concept in education. At the moment the benefits are praised. Nevertheless, the technology can influence negatively to us and the social interaction has been already changed. As a separate theme, it would be interesting to know how the digitalization affects the social relationships in the organizations and how the customers feel the value of the service if it will be digitalized.

5.4   Research questions summaries

RQ1: What are the key factors influencing on individual's digital competence development?

In order to understand the key factors influencing the one's digital competence development, the information from literature review and the survey were compared and finally combined. The factors were analyzed with the theory and identified. The factors were listed in Figure 38 and are examined more closely in Chapter 4.4. The factors discovered by the survey are closely interrelated to the theoretical framework. The factors are the same as in every learning process, but the variables from the environment, trends, culture, background, learning tools and learning methods influence on the process. This framework can be used in understanding other learning and competence development processes, for instance in organizational learning and students' education.

RQ2: What are the main challenges the LUAS teachers are facing currently in their digital competence development?

When the preliminary surveys were performed with the management and the literature review was performed, the original hypothesis was that the digital competencies of the teachers are not sufficient. However, after concluding the survey, it was clear that the LUAS teachers are motivated to learn new things. The most crucial issue is that the strategic objectives of LUAS should be actualized. The second barrier from the organizational point of view is the support which means in this context the time and motivational resources. The possibilities to

participate in the training should be increased, so that the organization could provide additional value and improved quality in its services. The challenges are introduced in the Table 4 in Chapter 4.4.

> *RQ3: How the digital skills of the teachers should be developed in order to improve the quality of education in LUAS?*

The quality of education is in connection with the digital competence development of the teachers. The organization must be aware of the factors and the challenges influencing on the competence development process. The organization should support the competence development process even though the learning is much dependent from the learner. By offering constructive, flexible and motivating environment with training opportunities, the LUAS teachers become more committed and satisfied. Simultaneously, the work results will be improved. By increasing the communication and feedback systems, the sharing of knowledge can be increased. The external and internal quality assurance processes should be developed so that the feedback process is continuous. The organization should be able to constantly develop itself to future trends. The recommendations for training are listed on Figures 37 and 39.

The prerequisites for training for everyone should be offered, so that the time, resources or workload will not become barriers. The training needs of each individual should be distinguished. The personal and team development should be followed with clear targets and on real-time. The reward systems should be motivating and support personal achievements. The core processes and work descriptions should be identified, so that the workload could be decreased. The employees should be able to participate more on the development processes within organization in order to feel their thoughts are appreciated.

5.5   Conclusions

The digital skills of the teachers and students are discussed and emphasized more due to the digitalization of higher education. The aim of this thesis was to provide reasons for increasing the knowledge about digital competence development. This

thesis has provided groundwork for understanding the individual's digital competence development process. During the Master's thesis process, the digital competence training needs and development areas of LUAS teachers were mapped in order to find out the current situation of their digital competencies. The problems and factors influencing on to the digital competence development were identified. The recommendations and development proposals were given based on the research.

The research underlines several challenges in strategic planning that are influencing on the digital competence development of the teachers. At the moment, the universities are still forgetting their main purpose which is the providing high-class education to the students. In order to respond better to the future changes of their operational environment, the digital competence development of teachers should be improved. The solution is to increase the organizational resources in the form of support for organizing training and removing the strategic obstacles. The quality of education and the teachers' digital competence development are bound together. The teachers become more motivated on participating training when they can produce added value to the students and the society. The teachers motivate also when they can develop themselves. When the teacher is not aware of future trends in education, like digitalization, the quality of teaching suffers. The students, local companies of Lahti region and society are those, who are influenced by the quality. The quality is reflected to the competitiveness and reputation of the university.

The learning can happen, when the person feels confident on moving forward on his or her personal development and is receptive to new ideas. The barriers of learning can prevent person to stay where s/he is without paying attention to anything new. LUAS has to bear in mind, that the organizational learning process is as important as the education offered to the students. The challenges influencing on the competence development of teachers can reflect to the learning results of the students. The students should be also offered more digitalized learning opportunities, applications and courses, so that the teachers can utilize their existing skills in practise. The interaction and cooperation with students and teachers can support the both them in developing their tacit skills. By sharing knowledge, the student's will become more prepared to the future challenges of

the work life. This will benefit the companies, because they can receive skilled workforce.

The management, the line managers and the human resource department of LUAS should identify the importance of the competence development of the teachers. This will help to support the development of organizational change towards digitalized education. The teachers are performing valuable work and when it is recognized from the organization, the satisfaction and commitment to the work increases. Change agents, mentors and coaches can help the teachers in their competence development process. The employees should be given recognition based on their competence development and personal progress should be actively and easily followed. The tools and assistance for technology should be provided. The practical training, like obsering how the others do should be offered in order to help in internalization of the new knowledge. Digital training should be offered. The training should be tailored according the needs of individuals or groups.

The quality audit procedures in digital competence development process should be more effective, so that the feedback is effectively utilized from external shareholders, like students, local companies, coordinates and government. The internal feedback in the training process should be constantly measured.

Digitalization should be also integrated to the teacher education provided in the universities. However, according to the research the organizational support is more important in employee's continuous learning process. The universities are competing about the skilled workforce, so the training possibilities, motivating and supporting work environment will be the key words in marketing the university to the new employees.

The digitalized education is connected to providing digital learning solutions and opportunities to the students. Nevertheless, the primary purpose of the education to provide sophistication should not vanish. The special needs, diversity and cultural backgrounds of the students need to be taken account when providing education. By being able to utilize different technologies and digital content skills in teaching, does not mean the person is able to combine the pedagogy in that concept. The cability to combine technology and pedagogy have be taken into

consideration in the recruitment process of the new teachers, because the ability to understand and choose the best possible learning methods, enrivonment and tools to the learner is essential.

Digitalization is inevitable part of our culture, so it will be essential to be digitally competent for instance work life, travelling, learning and doing our daily activities. Undoubtedly, digitalization should be included to the education because the new skills and awareness is important part of success in this life. However, digitalization is just a one trend among the others, because the environment where we are living is contantly changing. The learning is depending from the learner's own initiativeness and openenss to new knowledge. The learning is endless process for everyone and the individual's learning experience should be appreciated.

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APPENDICES

APPENDIX 1 Preliminary interviews

The first stage was to understand the current situation of in Lahti University of Applied Sciences (LUAS). These interviews were open constructional interviews.

Introduction of interviewees

The Development manager of Lahti University of Applied Sciences Harri Kuusela has been participating to the virtual campus project together with Federation of Universities of Applied Sciences. Kuusela has experience on developing web based learning activities for over ten years. He has written several articles regarding this matter and participating actively to development groups. This is the reason why he was interviewed. The main target group in the virtual campus project is the students. The aim is to support their learning processes in all phases of their lives. The students cover in this context also the shareholders and the staff of the university. Kuusela has also been participating on the development of the mobile pedagogy processes. Kuusela has proposed that all the FUAS universities should transfer to BYOD-policy. The purpose is to change the whole learning environment and to optimize the processes of the organization. This will be done by measuring the performance, standardizing the processes and offering training to the employees of the FUAS. The aim is to deduct the costs with increased cooperation and enhanced processes. This will lead to improvement of the organizational performance.

The Information Manager Tommi Kangasaho and Information Systems Manager Mika Rauhala were interviewed in order to get understanding of the problems related to the mobile teaching technologies on the viewpoint of ICT department. Tommi Kangasaho is responsible for managing the ICT department of LUAS and Koulutuskeskus Salpaus, which is secondary level institute. Mika Rauhala is responsible for development of the information systems of LUAS and Koulutuskeskus Salpaus. The interviews were open conversational interviews. The first interview with Tommi Kangasaho was conducted in telephone. The interview with Kangasaho changed from personal meeting to telephone conversation. The original aim of the interview was to discuss about the costs

related to software and hardware investments. However, the focus changed towards the organizational change rather than figuring out specific costs. The costs are not easily available or they are hard to define.

Mika Rauhala was met in personal meeting with Ladec representatives. During the thesis process, the LUAS agreed with ICT-cooperation with six other universities of applied sciences to respond to the challenges of digitalized learning. The aim is to share resources like the server rooms. On this way, the universities can deduct the costs and meet the service needs better.

Heikki Paananen is teaching data processing in the LUAS faculty of technology. He has organized projects regarding virtualization, where the students were studying in virtual learning environments and software. The experiences were gathered into Wiki, which is the development tool of teaching and learning in LUAS. These projects have been created from Paanenen's own interest on the teaching technologies. Paananen is a member of expert group that are participating on developing alternative learning methods. The interview was open conversational interview. On the same meeting, Harri Kuusela participated too. Paananen was interviewed, because he is specialized in creating and experimenting new learning tools.

Jenni Meriläinen is working as an adviser in e-learning and educational technology. She was interviewed in open interview with Harri Kuusela when discussing about the digitalization.

Current situation

At the moment, the faculties are situated in different locations. The each faculty has different infrastructure designed for their special needs. For instance, in the faculty of technology, there are more computer related courses than in the business faculty. In the faculties of technology and design the complicated technical applications and tools are used for daily basis. There are different requirements for the devices and software. In the field of technology and design, the devices are more powerful and the software is more complicated than in the field of business and social sciences. This also means, that the devices and

software are more expensive on the field of design and technology. The devices and software require updating and maintenance. The devices are mainly leased. The lease contracts can be long, so the devices can become obsolete. Due the obsoleting, the school cannot respond the needs of the changing technology and the students may not have the latest skills. The software on the other hand, comes from different service providers and there are several contracts. These software contracts can be also fixed term, so they cannot be renewed in the middle of the season.

At the moment, the students can bring their own devices to the school if they want to. The school provides computer rooms that are equipped with computer, scanners, and printers and fixed as well wireless network. The students can also borrow tablets or laptops from the library. The school provides the software required during the lessons. The qualifications of the software vary, because different faculties have different needs. The faculty of technology and design has more powerful computers than the faculty of business studies as the faculty of technology is using more complicated software, like Audio Cad and Photoshop. In the business faculty, the Microsoft Office tools are the most important tools used during the lessons. The students use their memory sticks or school's hard disk to save their works. There are some free of charge cloud services in use, like Dropbox and Google drive.

The teachers are equipped with the laptops and mobiles phone, so the teachers are also mobile. They can also work from home office. The administration department has created the curriculum according the needs of every course or specific faculty. The learning spaces and rooms are defined in beforehand. The teachers can influence on the room booking if they have special needs for teaching, for instance the requirement for computer rooms. Sometimes, the teacher can also book a computer room for a certain project in the middle of the study period and the administration department takes care of the bookings.

According the development team, one of the key problems at the moment are the high costs of the computer classes. The costs consists of the costs of the devices, software, licenses and the variable costs related to the maintenance of the

computers by the ICT department. The devices are leased, getting old and they require updating. The ICT department has to use their resources to maintaining the computer classes and also giving support for the students and teachers. The classrooms are not used as intensively as before and they are running empty. This will also cause additional costs. The reason for empty rooms is the fact that the students are having their own laptops or they are performing their tasks at home. The development unit would hope that the number computer rooms should be declined.

The financial aspect of the strategy was stressed, because the resources in Universities of Applied Sciences are limited. It would be good to evaluate the profitability of using the mobile technology in learning and the students bringing thir own devices. It would also increase the cooperation with the students and they could study whereever they want to.

It was mentioned that the teachers are hoping some improvements on the reward system, so that they would become more motivated for digitalization. Some of the teachers are reluctant to the change and they prefer more traditional teaching methods.

Future

The Lahti University of Applied Sciences will be moving to the New Campus area and the infrastructure needs to be designed. The new campus should provide innovative learning environments and new pedagogic solutions for the students. The rooms should be easily convertable. The students could move more freely outside the classrooms. The spaces need to be designed taking account the mobile learning technologies. The classes and other learning spaces should be convertable to different purposes. The other challenge is the sizes of the student groups, because they are getting bigger in the future. The spaces on the other hand are getting smaller. Niemi Campus could act as a science park, where resource and development work should be concentraed on the same area. The local companies and Helsinki University could locate on the same science park. The resources like the server rooms and multipurpose rooms could be shared and the costs could be divided.

It would be important to create checklist for the organization which would help to design the mobile learning technologies. The infrastructure and functionality of the model should be considered. The digitalization will be effecting on the infrastructure of the new campus, because they need to define how much space is reserved to computer classes, multipurpose rooms or showrooms for the certain group of students. Also the electricity of the spaces needs to be planned and this means defining for instance how many fixed Internet connectors and device plug points there will be found.

The privacy issues of digitalization should be taken into account, because the administration and student network should be protected in order to avoid information leakages. The emails of the administration cannot be transferred to public access providers like Google. The secure VPN (Virtual Private Network)-access should be created in order to access school's network outside the school. The network should be protected, even in"nuclear war". The notion of Ministry of Education and Culture towards mobile learning technologies should be taken into account. The development unit hoped the mobile learning technologies would benefit the university economically.

However, the mobile learning technologies and"Bring your own devices"-policy cannot be straightly implemented to all of the faculties because requirements of technology are not the same in all faculties. In the faculties of design, business and technology, different kind of software and software are used. The design and technology use more complicated and expensive software than the business faculty. Also the devices need to be more powerful in the design and the technological studies than in the business studies. This makes the standardization of the policy difficult and not easily to adaptable to all of the faculties. However, if he students would bring their own devices, they should not have different versions of the required software. The definitions of requirements should be created.

According development team the technical problems and privacy issues need to be considered. The functional wireless network should be created if the BYOD-policy should be taken into use. The design of technology needs to be considered

by the professionals of ICT, because the requirements of the software and hardware need to be defined for each faculty. The whole learning environment should be taken into account when designing BYOD-policy.

The vision of development team was that the students would bring their own devices in the future, but it should be considered whether or not the school would support the students to buy the software and the hardware. The faculties could transfer gradually to the new model. The virtual learning should have own support laboratory and the teachers should be given training on the topic.

ICT Managers

The Information Manager Tommi Kangasaho and Information Systems Manager Mika Rauhala were interviewed in order to get understanding of the problems related to the mobile teaching technologies on the viewpoint of ICT department. The other interview was conducted in telephone and the other in face-to-face meeting. The both interviews were open conversational interviews.

The ICT-department of LUAS is transferring to service concept and the support actions are deconcentrated to couple of people. According ICT-department, it is not clear what are the total costs of the investments, licenses, devices, software, and the labor. The information is not available or it is in complicated form that cannot be combined. This is due different service providers and leased devices and software. The different updates of licenses and different versions of software are also creating additional costs. The total costs of investments cannot be calculated because of the scattered cost structure. If the whole operating infrastructure is going to be changed, it will require major investments and additional costs.

According ICT-department, it would be more important to have clear policies and rules how to act when it comes to BYOD-model and mobile learning technologies. The whole organization needs to cooperate and all of the departments should change their attitudes towards the mobile teaching technologies. He mentioned that especially the teachers require change in their way of thinking. The pedagogic ground rules were lacking.

The ICT-department would hope that they could use their resources better to their own work. At the moment they have resources bound to the maintenance and support work related to the existing computer rooms. The device and software related problems take their resources as the teachers and students require assistance. The software providers are not very interested on the new learning complex, because they would like to have big customers instead of individual users.

When considering the wireless network, it should be considered how much the students will utilize the new network. According the ICT department, the school already has effective network. The service providers should be considered. Some of the student groups may still require certain occupational software provided by schools, because the investment on the software can be too expensive for individual student. One solution could be so called"remote access" services. This means the student can log from own computer to the school's data processing system. When the amount of fixed computers will decline, also the amount of printers will decrease.

There is also ambiguity what is the responsibility of each department and the division of labor. The ICT department thought that the policies and decisions need to come from the top management and they were hoping to have some kind of ground rules for action. The pedagogic purpose of using the mobile learning technologies should come from the management level. The training should be organized for the whole organization, especially to the teachers.

Technology teacher

Heikki Paananen is teaching data processing in the LUAS faculty of technology. The learning technologies were discussed in conversational open interview in a meeting. He has organized projects regarding virtualization, where the students were learning in virtual learning environments and software. The experiences were gathered into Wiki, which is the development tool of teaching and learning in LUAS. However, these projects have been created from Paanenen's own interest on teaching technologies. Paananen is a member of expert group who are participating on developing alternative learning methods and this is the reason

why he has been selected to the interview. The interview was open conversational interview and it was conducted in a meeting.

Based on this interview, there are not many teachers trying to teach with alternative learning methods. It seems that the LUAS is missing the ground rules for implementing technology enabled studies even though the various learning environments are emphasized in the organizational strategy. The organizational structure is not supplementing the new kinds of learning methods and innovativeness. The teachers would require more support on experimenting and organizing new activities. The teacher's own imitativeness and willingness to develop his or her professional skills is the key to trying new things.

The change towards using alternative learning methods should be the objective of the whole organization. There have been positive results of using the alternative learning methods in school projects. These results should be communicated from the top-level to low-level of organization. The change towards the learning technologies should be the mission of everyone within the organization.

APPENDIX 2. Second preliminary interview questions

1. Miten Lahden ammattikorkeakoulussa on tällä hetkellä otettu huomioon teknologian hyödyntäminen opetusstrategiassa?

   How the technology integration has been taken into account in the pedagogic strategy of Lahti University of Applied Sciences?

2. Mitä uudistuksia uusi yhtiömuoto (osakeyhtiö) tuo opetukseen, organisaation rakenteeseen ja organisaation toimintaan?
   What kind of changes the transfer from public organization to private limited company will bring to the organizational structure and the activities of the organization?

3. Muuttuuko organisaation rahoitusmalli vai säilyykö nykyinen rakenne?
   Are there going to be changes in the financing of the organization or will it remain the same as before?

4. Onko rahoituksessa liikkumavara esimerkiksi kehitystyöhön? Is there reservation for development work in the financing?

5. Millä tavoin strategiaa pyritään kehittämään? How the strategy will be developed in the future?

6. Mitä työkaluja strategian rakentamisessa käytetään?
   What kind of tools are you using to compiling the strategy?

7. Miten uudet teknologiat otetaan huomioon opetusstrategiassa? How are the new technologies utilized when creating pedagogic strategy?

8. Millä tavoin organisaatiossanne edistetään innovatiivisuutta? Esimerkiksi johdon taholta? On what ways the innovativeness is promoted within your organization? For instance, how the management support the innovativeness?

9. Millaiset resurssit organisaatiossanne on innovatiivisuuden kehittämiseen? What kind of resources do you have to develop the innovativeness within your organization?

10. Onko olemassa innovaatiotyöryhmää, joka suunnittelee strategiaa, seuraa opetuksen uusia trendejä sekä ympäristön muutoksia tai tuo uusia näkökulmia opetukseen? Is there innovation group that plans the strategy, follows the new trends in education and also the changes in the environment and brings new viewpoints to the teaching?

11. Miten organisaatiossa tapahtuvat muutokset viestitään henkilökunnalle ja miten henkilökunta osallistuu muutosprosesseihin? How are the changes in the organization communicated to the employees and how the employees are participated in the change processes?

12. Onko opiskelijoiden tietoja hyödynnetty strategian kehityksessä tai uusien opetusmenetelmien luomisessa? How are the skills of the students utilized in the development of strategy and creating new learning methods?

13. Miten opettajia tuetaan innovatiivisten opetusmenetelmien ja teknologioiden käytössä/kehityksessä? How are the teachers supported to use innovative learning methods?

14. Onko opettajille ja muulle henkilökunnalle tarjolla koulutusta uusien opetusmenetelmien parissa? Does the organization offer trainingfor teachers to use new learning methods?

15. Miten yhteistyöverkostoja ollaan jatkossa kehittämässä? What kind of cooperation networks are planned in the future?

16. Miten tiedon jakamista edistetään organisaatiossanne? How is the knowledge sharing promoted in your organization?

Kiitos! Thank you!

APPENDIX 3. Second Preliminary interview results

The Development Manager of Lahti University of Applied Sciences Maarit Fränti was interviewed in order to find out what kind of tools LUAS is using in their strategic and organizational development. The interview was conducted by theme interview in the personal meeting. Fränti is also responsible for development of the teaching and research work. Her main duties to develop new learning environments, strategic quality management and competence management related to the study plans. Fränti has worked earlier in the Laurea University of Applied Sciences in management positions. Fränti crystallizes that the main challenges in her work are the changing needs of the work life, Lahti region and students. Also the regulations of the Ministry of Education need to be fulfilled. Fränti started working in LUAS on first of August 2014. It was just before the organizational change of LUAS to private limited company.

The organizational structure has changed from publicly owned organization into private limited company. The aim of LUAS is to increase flexibility within the organization and concentrate on the objectives given by the Ministry. The financing is based on the profitability of operations and supported by government. (Fränti 2014)

The strategy is divided into main strategy and under that are the pedagogic, regional and research and development strategies. The strategy is developed at the moment due the organizational change. Lahti University works in cooperation with Federation of Universities of Applied Sciences (FUAS). They develop common strategy that works as a guide when implementing own strategy in Lahti University of Applies Sciences. Each of the FUAS member universities have their own quality assurance processes that will influence on the processes of the other universities. (Fränti 2014)

The strategic key performance indicators are the integrated pedagogy, innovativeness and increased entrepreneurship of students. The development areas are the integrated pedagogy, the practical research and development work, diverse learning environments and responsible management and renewing competence

development. These critical success factors are part of quality system and they are measured regularly. (Fränti 2014)

The whole organization and the shareholders are participating on developing the strategy. The opinions of students are also taken into account. The strategy is developed by web based survey and within project groups. The implementation of the strategy is followed by estimating the success of the strategy. The strategy is one part of the quality system. At the moment, the impacts of technology are not considered within the strategy even though the organization is aware of effects of digitalization. (Fränti 2014)

According Fränti, when changing strategy, it is also important to respond to the trends of the education. The universities of applied sciences need constantly update their operations and also follow their competitors. The regulations and laws of the government may change and it has influence on the operations of the university. However, the changing of organizational culture is a long process and it cannot be done immediately. (Fränti 2014)

There are differences with the universities and some of them are really flexible. However, when starting to change strategic processes, the careful planning and good communication are important. In Lahti University of Applied Sciences, the company intranet is used to communicate about the changes. However the problem is that the intranet does not reach all the people and the information is not regularly updated. On the same time, the amount of emails is reduced within the organization. (Fränti 2014)

The feedback is constantly gathered to develop the operations. The communication is open because some kind of secrecy increases the change resistance. The Principal of LUAS also likes to receive formal and informal feedback. Of course, there are always people that are not happy with the changes and then the middle managers are in the important role when it comes to managing the change resistance. The employees can participate on development days, where they can work in different groups and increase synergies with other people. There are also certain development projects concentrating on specific themes, where people can apply or they are invited. The project manager will

choose the proper candidates to the project based on what kind of skills are required. (Fränti 2014)

The teachers are supporting the students to use new technologies. The learning processes are now more flexible and they cannot be determined in advance, because the learning methods are changing. The students are also changing and this affect their ability to use technology. The younger generations are familiar with using the newest technology. The teachers usually remain the same, so their competence development should be supported. The mapping of competencies is performed by the human resource department, but the problem is the large scale of different competence requirements in the organization. The human resource development is quite new concept within the organization. (Fränti 2014)

The teachers should participate into the development processes within the organization so that they are also aware of the organizational goals. The organization is supporting the teachers to participate in training days. The knowledge sharing is done in different networks for instance web portals. The teachers can also try experimental learning activities if they like, but there are some challenges to create new working methods. The teachers should share knowledge with each other and recommend new activities to each other. (Fränti 2014)

The different faculties have different type of curriculum and it can cause problems. The learning tools can also vary, because for instance the technical and graphical faculties are using different software and devices than the business faculty. The competencies of the teachers vary depending what they are teaching and how keen they are on developing their own awareness of new technologies. (Fränti 2014)

The team work inside the organization and the external cooperation with other universities and companies is important way to share knowledge. The cooperation with domestic and international universities consists of joint-projects, seminars and courses. The students, employees and teachers are encouraged to mobility. However, the knowledge sharing should still be increased. The cooperation with

the companies should be also increased in order to respond to the future trends of the industry and produce the workforce to those new markets. (Fränti 2014)

The communication should be also increased in order to increase knowledge sharing inside and outside the organization. The communication and cooperation helps to respond better to the challenges of the labor market and the needs of the companies in the region. The communication and cooperation inside the organization helps to develop the skills of the teachers regarding technology, the students can develop their skills and also the change management can be performed better. (Fränti 2014)

APPENDIX 4. The competence development survey

Digitalization and digital training needs

This research is made in order to map the digital competencies and training needs of the tea
compulsory. Please leave your contact details at the end of the questionnaire, if you wish to
Thank you in advance!

100% completed (1 of 1 pages)

Digitalization and digital training needs

This research is made in order to map the digital competences and training needs of the teac
compulsory. Please leave your contact details at the end of the questionnaire, if you wish to
Thank you in advance!

BACKGROUND

○

1. Title *

Lector

Full-time teacher

Principal teacher

Part-time teacher

○

2. Work experience in LAMK in years: *

Under 5

5-10

10-15

Over 15

○

3. Work experience from other field than education: *

None

1-5 years

6-10 years

11-15 years

4. Which of the following teaching methods do you prefer? (Please select 1 or more optio

☐ Web-based learning activities

☐ Digital learning tools

☐ Blended learning

☐ Distant learning

☐ Learning through projects

☐ Work-based learning

☐ Developing entrepreunership

☐ Physical contact lectures

☐ Students bringing their own devices

☐ Other

COMPETENCES

○

5. How would you evaluate your digital skills?(Ie. using different digital learning environ
teaching) *

Excellent

Good

Fair

Below average

○

6. Please evaluate how well the teacher education provided by the university prepares the
learning methods and tools in teaching: *

Very well

Some update required

Passable

Poorly

7. On which of the following digitalized teaching areas would you require more developm
more options): *

☐ Create and edit digital material

☐ Share resources in social bookmarking (ie. Pinterest)

☐ Use blogs and wikis

☐ Find and evaluate authentic web based content

☐ Use video and audio content

☐ Use digital communication tools

☐ Communicate with other teachers in social networks

☐ Identify plagiarized student works

☐ Ethics

☐ Privacy issues

☐ Copyright issues

☐ Using classroom technologies(ie. digital badges,presentation tools,online teaching)

☐ Find and use different learning tools

☐ Evaluate student performance in digital learning environments

TRAINING NEEDS

◯

8. How many times have you participated on training regarding digitalized teaching meth

learning environments? *

More than 10 times

5-10 times

Under 5 times

Not at all

9. Do you feel you have good prerequisites to participate in training regarding digitalized

○ Yes , I have good opportunities to participate

Reasonable, I have attended to training if possible

Bad, I have rarely participated to the training

Not at all

10. How would you like to participate on the training: **(Please select 1 or more options)**

☐ Lectures

☐ Distance learning

☐ E-learning

☐ Day-time training

☐ Evening-time training

☐ Training abroad

☐ Combined learning (partly distance, individually, physical lectures)

☐ Cooperation with other universities

☐ Learning on my own

11. Who would be the most suitable organizer of the training related to digital teaching? **(**

☐ European Union

☐ Other

12. What would be he reasons to apply to training related to digitalization: **(Please select**

☐ Own development needs

☐ The recommendations from the workplace

☐ The objectives of the faculty

☐ Advancement in career

☐ The needs of the students

☐ The social pressure from the workmates

☐ Accomplishing the strategic objectives of organization

☐ Updating teacher education competences

☐ Improving the quality of teaching

☐ Other reasons

13. What are the main challenges in participating training?**(Please select 1 or more optio**

☐ Lack of resources (financial, organizational)

☐ Lack of support from the management

☐ Lack of time

☐ Lack of own interest

☐ The challenges of organizing own work

☐ Other reasons

DIGITALIZATION

14. In the future, the digitalization will have stronger influence on education. What kind o

to develop the digital education in schools: *

☐ Improvement on reward system (ie.rewarding teachers who are active in developing
competencies or using digital teaching methods)

☐ More support from the organization to develop own competencies

—

☐ Students bringing their own devices

☐ Providing students more online services

☐ Development days and work-shops for teachers

☐ Ensuring education for students at any time at any place

☐ Digital skills of students should be mapped in order to support them in learning

☐ Digitalization should not be included to education

17. Comments to digitalization, students bringing their own devices, quality of teaching, c
of the teachers, positive or negative associations of digitalization, the change of teacher's r
than teaching due digitalization:

_____

_____

_____

BACKGROUND

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1. Title *

Lector

Full-time teacher

Principal teacher

Part-time teacher

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10-15

Over 15

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☐ Distant learning

☐ Learning through projects

☐ Work-based learning

☐ Developing entrepreneurship

☐ Physical contact lectures

☐ Students bringing their own devices

☐ Other

COMPETENCIES

○

5. How would you evaluate your digital skills?(I.e. using different digital learning enviror
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    Good

    Fair

    Below average

○

6. Please evaluate how well the teacher education provided by the university prepares the
learning methods and tools in teaching: *

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    Some update required

    Passable

    Poorly

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☐ Communicate with other teachers in social networks

☐ Identify plagiarized student works

☐ Ethics

☐ Privacy issues

☐ Copyright issues

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☐ Find and use different learning tools

☐ Evaluate student performance in digital learning environments

TRAINING NEEDS

○

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More than 10 times

5-10 times

Under 5 times

Not at all

○

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Yes , I have good opportunities to participate

Reasonable, I have attended to training if possible

Bad, I have rarely participated to the training

Not at all

10. How would you like to participate on the training: **(Please select 1 or more options)**

☐ Lectures

☐ Distance learning

☐ E-learning

☐ Day-time training

☐ Evening-time training

☐ Training abroad

☐ Combined learning (partly distance, individually, physical lectures)

☐ Cooperation with other universities

☐ Learning on my own

11. Who would be the most suitable organizer of the training related to digital teaching? **(options) ***

☐ Own workplace

☐ University

☐ University of applied sciences

☐ Private training house

☐ Company offering digital learning solutions for schools

☐ Ministry of education in Finland

☐ European Union

☐ Other

12. What would be he reasons to apply to training related to digitalization: **(Please select**

☐ Own development needs

☐ The recommendations from the workplace

☐ The objectives of the faculty

☐ Advancement in career

☐ The needs of the students

☐ The social pressure from the workmates

☐ Accomplishing the strategic objectives of organization

☐ Updating teacher education competencies

☐ Improving the quality of teaching

☐ Other reasons

13. What are the main challenges in participating training?**(Please select 1 or more optio**

☐ Lack of resources (financial, organizational)

☐ Lack of support from the management

☐ Lack of time

☐ Lack of own interest

☐ The challenges of organizing own work

☐ Other reasons

DIGITALIZATION

14. In the future, the digitalization will have stronger influence on education. What kind c
to develop the digital education in schools: *

- [ ] Improvement on reward system (ie.rewarding teachers who are active in developing competencies or using digital teaching methods)

- [ ] More support from the organization to develop own competencies

- [ ] Curriculum should be re-created to match digital requirements of the society

- [ ] Sharing knowledge about the matter

- [ ] Cooperation with other universities

- [ ] Following the trends of education and informing teachers

- [ ] Clear policies and regulations from organization to act

- [ ] Better ICT equipment and tools

- [ ] Competence mapping and development of teachers

- [ ] Evaluating the health risks of digitalization

- [ ] Regulations and rules from the government

- [ ] More education and training regarding digitalization

- [ ] Training for teachers during work time

- [ ] European Union guidelines

- [ ] More resources (time, money) on the main teacher's work

- [ ] Team and group work to develop teaching and learning

- [ ] Cross-organizational cooperation

- [ ] Cooperation with students

- [ ] More-integrated software for all devices

- [ ] Students bringing their own devices

- [ ] Providing students more online services

- [ ] Development days and work-shops for teachers

- [ ] Ensuring education for students at any time at any place

- [ ] Digital skills of students should be mapped in order to support them in learning

- [ ] Digitalization should not be included to education

15. Comments to digitalization, students bringing their own devices, quality of teaching, of the teachers, positive or negative associations of digitalization, the change of teacher's than teaching due digitalization:

_____

_____

_____

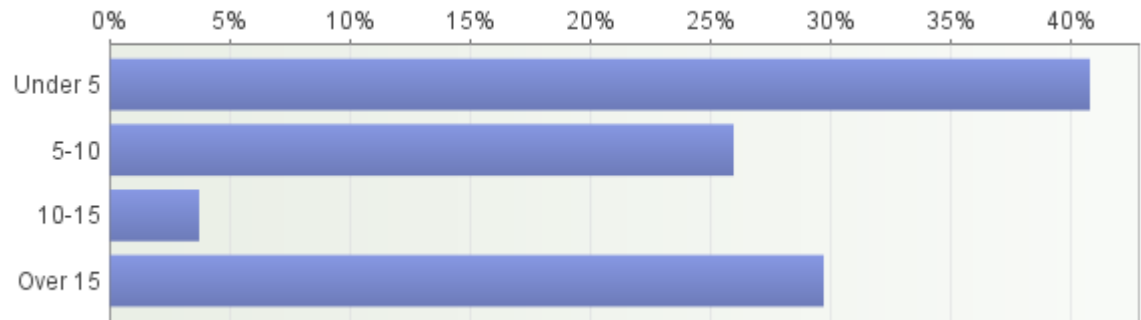APPENDIX 5. The competence development survey results

Digital competence mapping

1. Title

Vastaajien määrä: 27
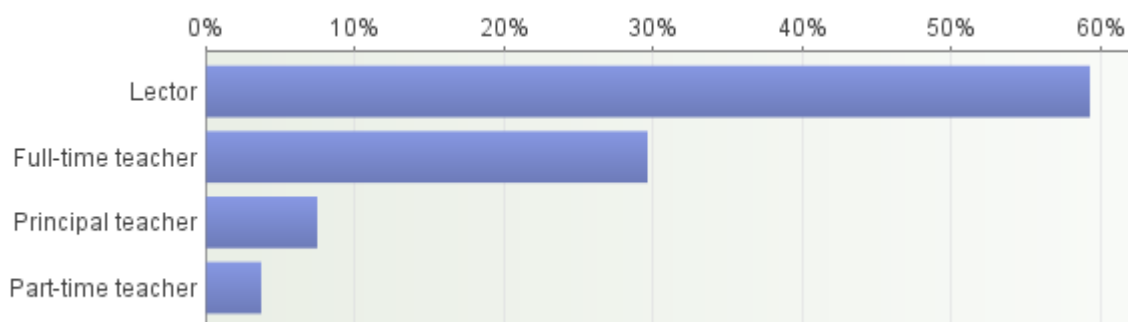
BACKGROUND

2. Work experience in LAMK in years:
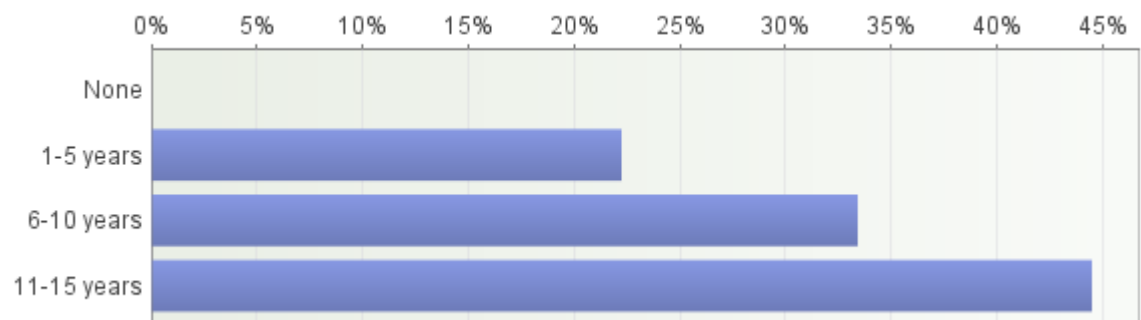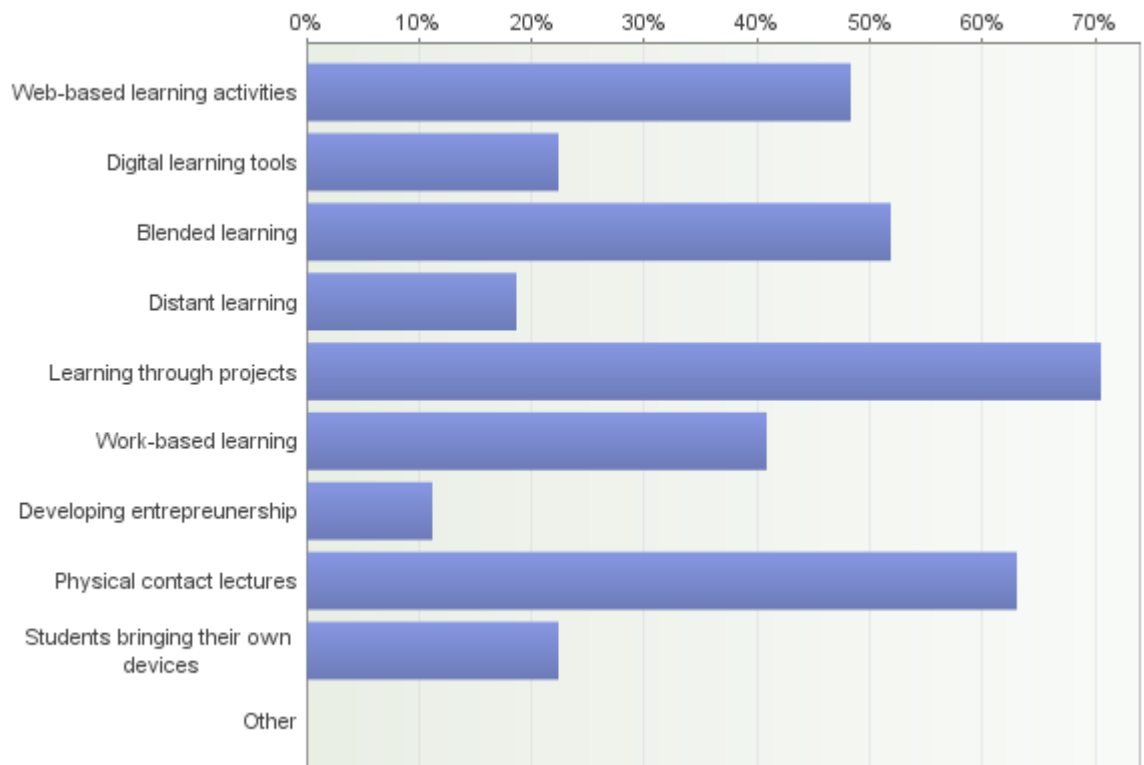
3. Work experience from other field than education:

4. Which of the following teaching methods do you prefer? (Please select 1 or more options)

5. How would you evaluate your digital skills? (I.e. using different digital learning environments, digital tools in teaching)
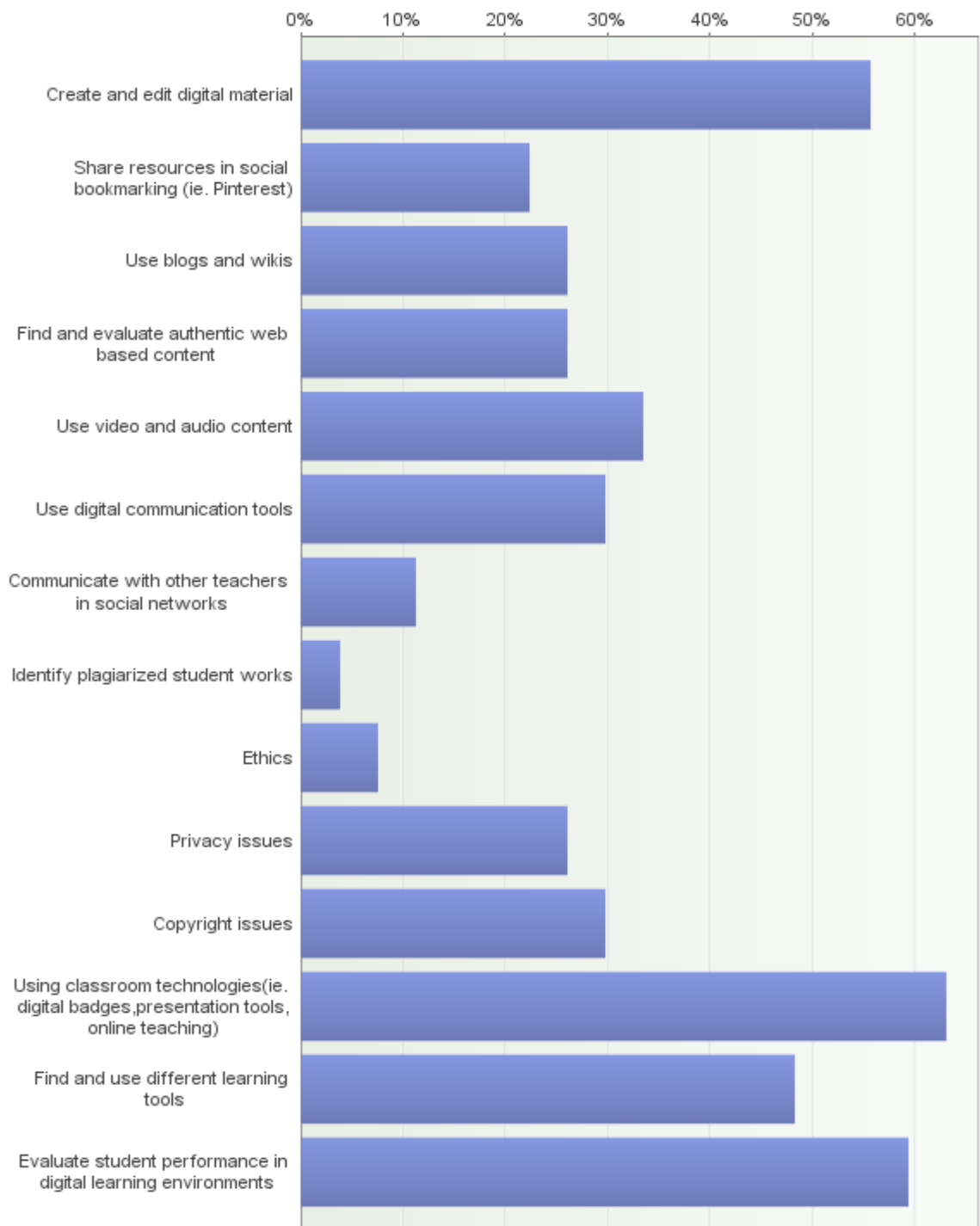
Vastaajien määrä: 27
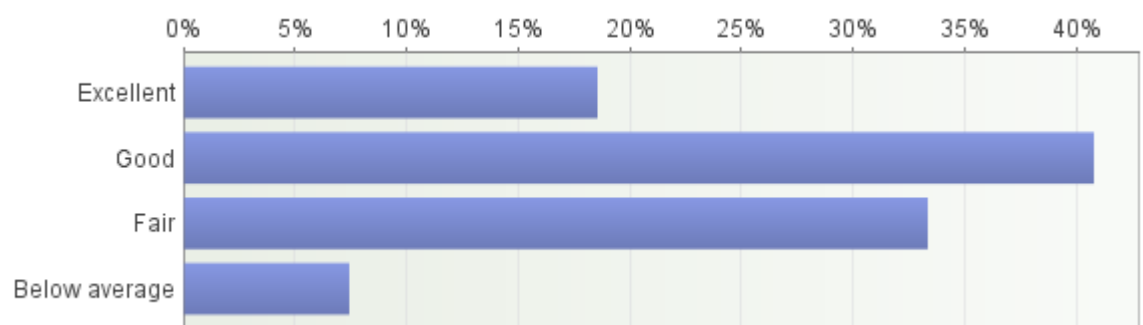
6. Please evaluate how well the teacher education provided by the university prepares the teachers to use digital learning methods and tools in teaching:

Vastaajien määrä: 27

	0%	5%	10%	15%	20%	25%	30%	35%
Very well								
Some update required								
Passable								
Poorly								
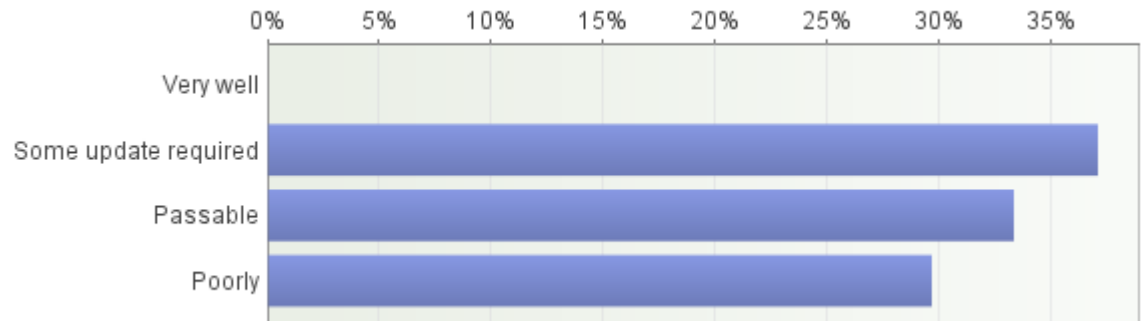
7. On which of the following digitalized teaching areas would you require more development? (Please select 1 or more options):
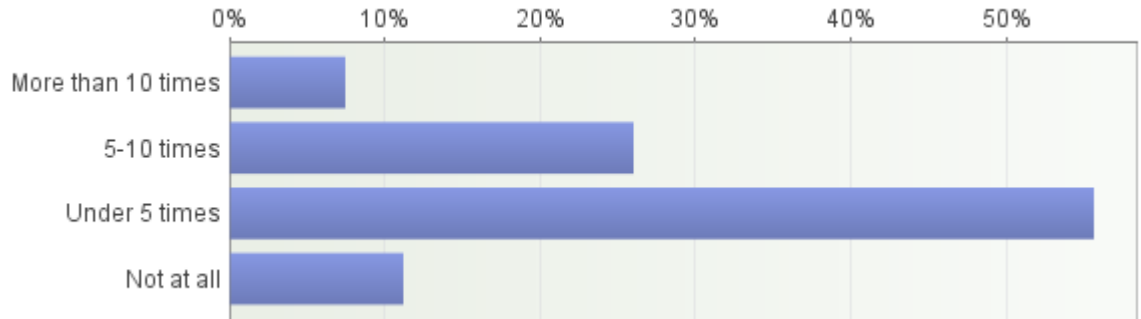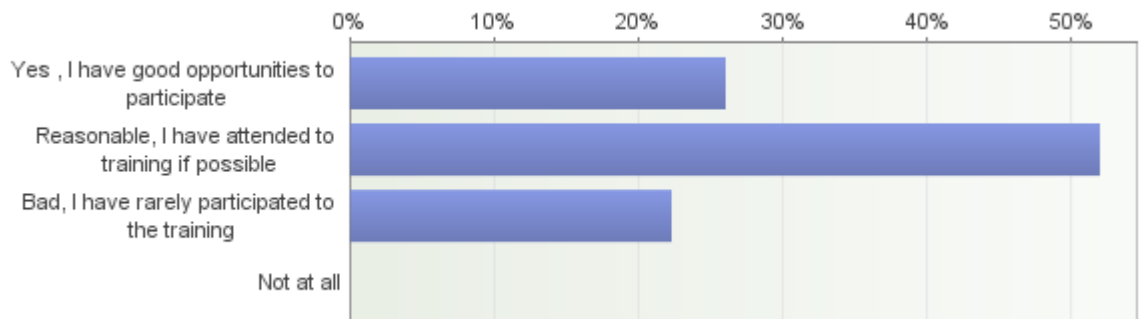
Vastaajien määrä: 27

COMPETENCIES

8. How many times have you participated on training regarding digitalized teaching methods, digital tools and learning environments?
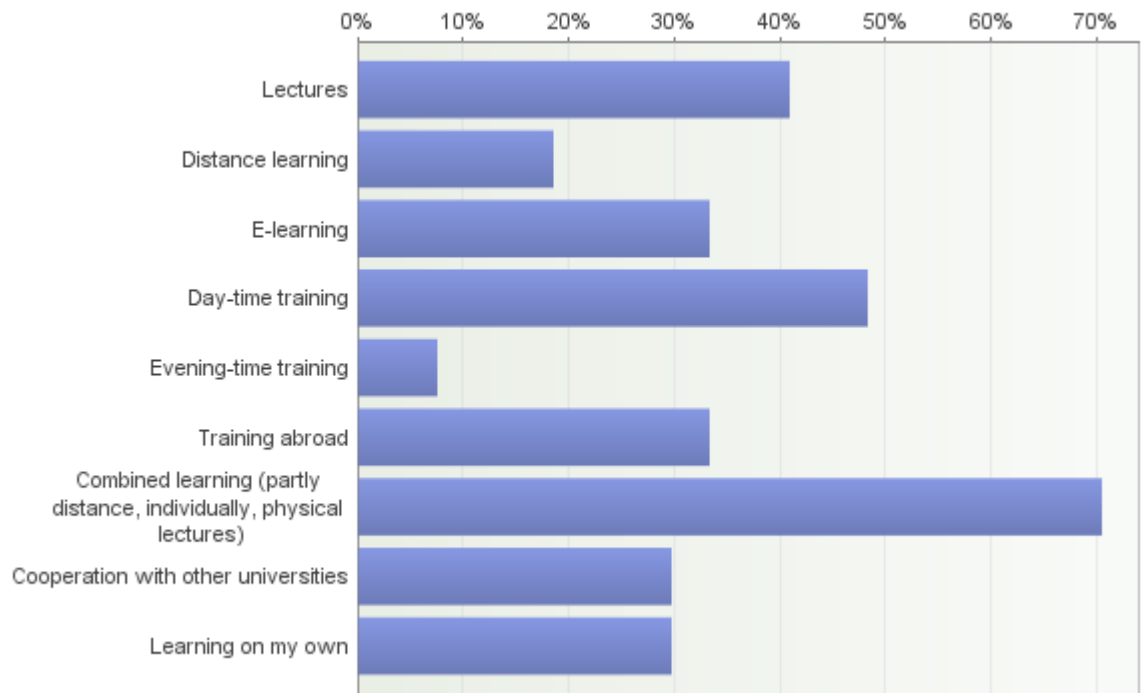
Vastaajien määrä: 27

9. Do you feel you have good prerequisites to participate in training regarding digitalized teaching?
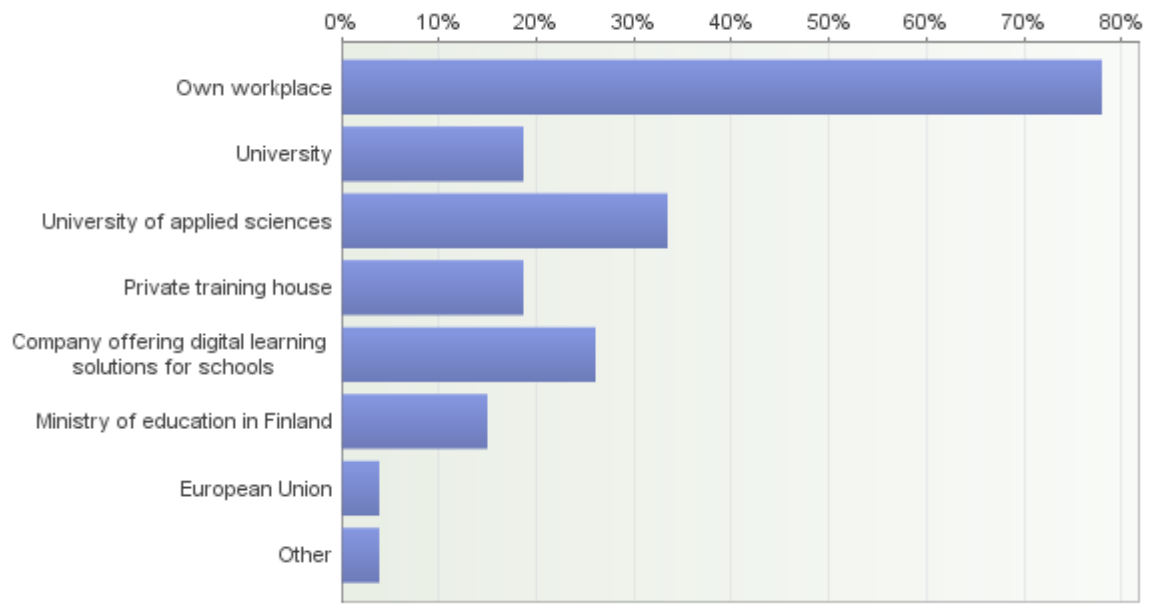
Vastaajien määrä: 27

10. How would you like to participate on the training: (Please select 1 or more options?)

Vastaajien määrä: 27

11. Who would be the most suitable organizer of the training related to digital teaching? (Please select 1 or more options)
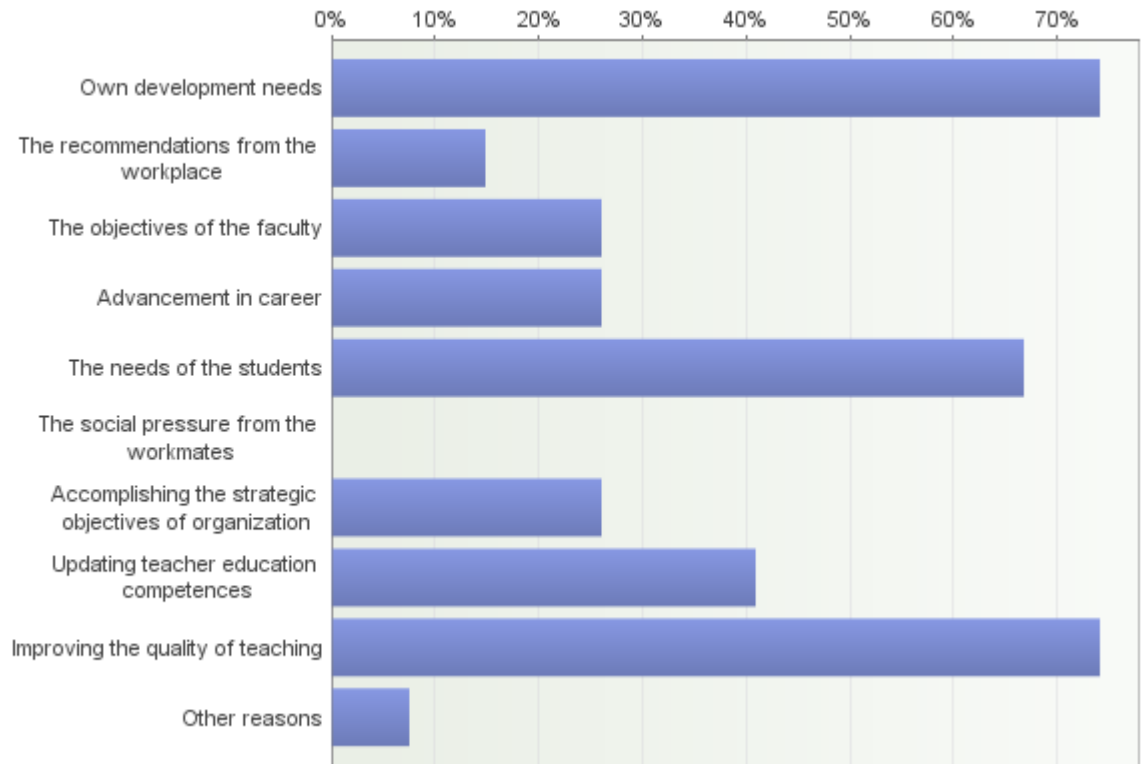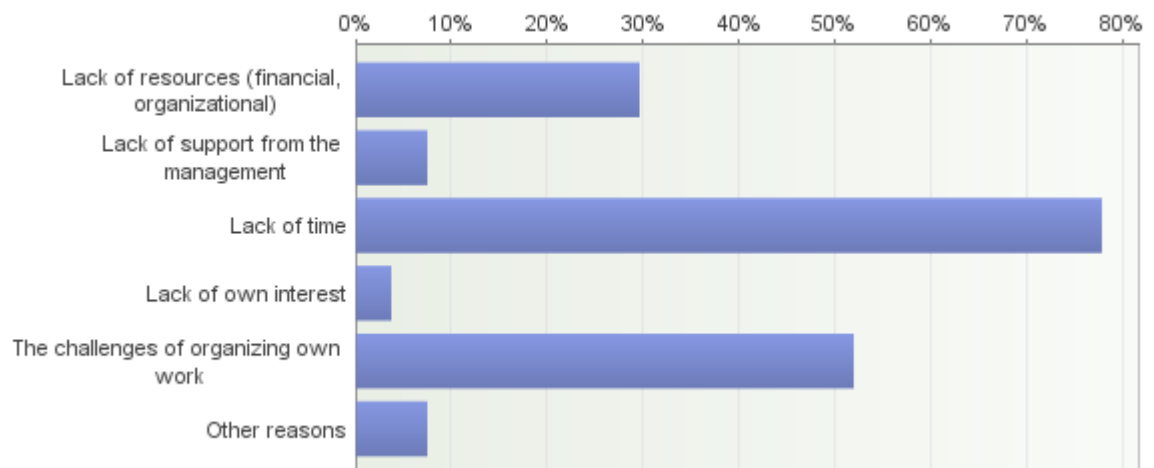
Vastaajien määrä: 27

TRAINING NEEDS

12. What would be he reasons to apply to training related to digitalization: (Please select 1 or more options)

13. What are the main challenges in participating training? (Please select 1 or more options)
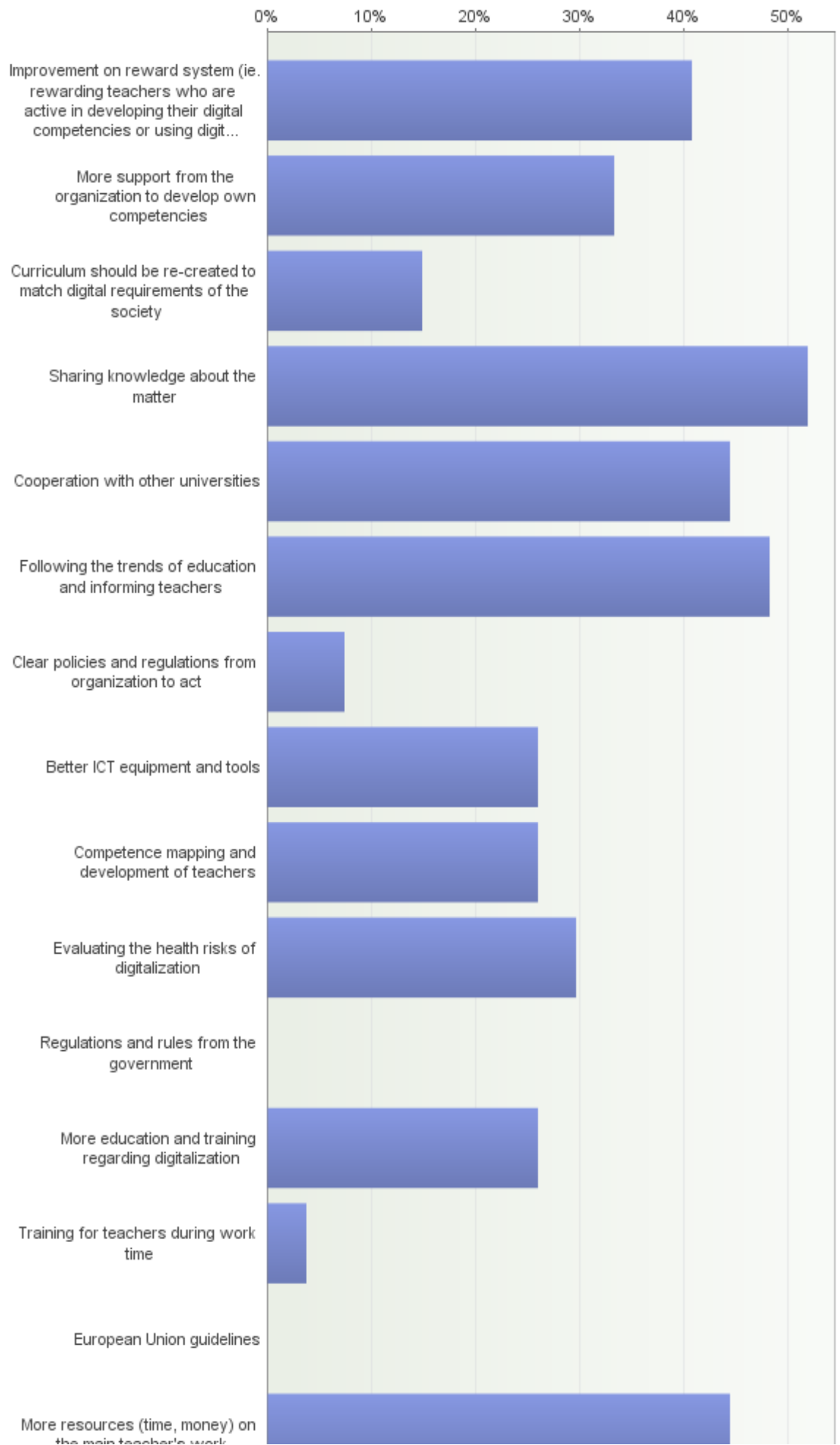
14. In the future, the digitalization will have stronger influence on education. What kind of actions would you hope to develop the digital education in schools?

Vastaajien määrä: 27

| | 0% | 10% | 20% | 30% | 40% | 50% |

Improvement on reward system (ie. rewarding teachers who are active in developing their digital competencies or using digit...

More support from the organization to develop own competencies

Curriculum should be re-created to match digital requirements of the society

Sharing knowledge about the matter

Cooperation with other universities

Following the trends of education and informing teachers

Clear policies and regulations from organization to act

Better ICT equipment and tools

Competence mapping and development of teachers

Evaluating the health risks of digitalization

Regulations and rules from the government

More education and training regarding digitalization

Training for teachers during work time

European Union guidelines

More resources (time, money) on the main teacher's work

15. Comments to digitalization, students bringing their own devices, quality of teaching, competence development of the teachers, positive or negative associations of digitalization, the change of teacher's role more like mentoring than teaching due digitalization:

Vastaajien määrä: 26

- kj
- This is important issue, hope we will have more tools to develop our digital learning skills
- Crucial topic, which needs multilevel tackling.
- The students entering our university may soon expect a lot more digitalization than we can offer, since they have got used to it in their previous schools. This is a challenge.
- :)
- ??????
- Digitalization brings more alternatives for studies both for students and teachers.
- The digitalization is already here and will improve more and more in the future. I think that situation then students bringing their own devices is only positive thing and using diffrent possibilities of Digi devices is improving quality of teaching.
- Different programs used by staff should be integrated in a way that there wouldn't exist any need to upload data more than ones.
- Software should be the same on all devices incl. students and part-time teachers own device. AD-passwords and part-time teacher's ability to access the intra should work longer than just the time of a course. Less different software to learn. Cloud-services very practical to use.
- sounds like fun to me
- hei hei
- ?
- "Digitalization" is one of the current hype words (innovation being another one). Undoubtedly, it brings many advantages, but any thinking person should also be critical of it and understand that it may have some downsides, too. It is a historical fact that technologies are not neutral in the ways in which they affect their users and eventually society as a whole. There is always a feedback loop between a given tool and its user. That is, because of the feedback loop, humans as tool users never simply use tools, but tools also affect and change their users.

  As you probably know, because of digitalization and the ever-increasing automation and robotization, we are currently living a transition period, and all these technological advances are currently changing and shaping our world, and this is of course happening on a global scale.

  In case you are not already familiar with these, I suggest you check out the following books:

  - Carr, Nicholas. The Shallows: What the Internet is doing to Our Brains?
  - -- " --. The Glass Cage: Automation and Us.
  - Lanier, Jaron. You're Not a Gadget: A Manifesto.

  Also the following, although it's not directly related to the topic:
  - Keen, Andrew. The Cult of the Amateur.

  You can also find some of their talks on YouTube. I highly recommend you see some of those.

- No comments
- If that is the direction that education is going, then it is hard to resist or go against it. I just hope that there will still in the future be the opportunity to say "now close the screen down, ignore the computers and look up here & pay attention"
- Future
- No comments
- ööö
- No comments
- .
- All time used for building new competencies is away from the acute daily routines. Organization does not really support self-development.
- Everyone should be able to use whatever devices they have to access information.

- This is a must. Teachers must develop their skills and are willing to do so, we have very good equipment, facilities and software but feels like nobody has the time to really learn how to use them to best support students. Maybe some teacher training (kehittämispäivät) should be focused only on digital issues and really learning the how to, instead of always discussing strategy and future. Digitalization is the future and it is very practical. Even younger teachers are not familiar enough with all tools we have in our use.
- X

APPENDIX 6. The competence development survey results of the question: 'Comments to digitalization, students bringing their own devices, quality of teaching, competence development of the teachers, positive or negative associations of digitalization, the change of teacher's role more like mentoring than teaching due digitalization:'

Technical	Motivation
• Different programs used by staff should be integrated in a way that there wouldn't exist any need to upload data more than ones. • Software should be the same on all devices incl. students and part-time teachers' own device. AD-passwords and part-time teacher's ability to access the intra should work longer than just the time of a course. Less different software to learn. Cloud-services very practical to use. • Everyone should be able to use whatever devices they have to access information.	• All time used for building new competencies is away from the acute daily routines. • Organization does not really support self-development. • Sounds like fun to me • This is a must. Teachers must develop their skills and are willing to do so, we have very good equipment, facilities and software but feels like nobody has the time to really learn how to use them to best support students. Maybe some teacher training (kehittämispäivät) should be focused only on digital issues and really learning the how to, instead of always discussing strategy and future. Digitalization is the future and it is very practical. Even younger teachers are not familiar enough with all tools we have in our use.
Education	Societal
• This is important issue, hope we will have more tools to develop our digital learning skills • Crucial topic, which needs multilevel tackling. • The students entering our	• Digitalization" is one of the current hype words (innovation being another one). Undoubtedly, it brings many advantages, but any thinking person should also be critical of it and understand that it may

149

university may soon expect a lot more digitalization than we can offer, since they have got used to it in their previous schools. This is a challenge.

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- If that is the direction that education is going, then it is hard to resist or go against it. I just hope that there will still in the future be the opportunity to

	say "now close the screen down, ignore the computers and look up here & pay attention" • Future

Other comments

- :)
- No comments
- No comments

- X
- -
- Ööö
- Hei hei
- ?
- Kj
- ??????