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E-LEARNING AND COMMUNICATION IN TEACHERS' TRAINING PROJECT

Case: ADAPTYKES project

LAHTI UNIVERSITY OF APPLIED SCIENCES
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ABSTRACT

This thesis is done for Lahti University of Applied Sciences. The aim of the thesis is to analyze ADAPTYKES project's course content, materials and the experiences of the participants. The results of the research are useful for the teachers who were organizing and teaching in ADAPTYKES project.

ADAPTYKES project was carried out in co-operation with Universities from Hungary and Romania. The purpose was to develop both long and short term trainings for leaders of local small and medium-sized enterprises in these two countries. The pedagogical design and the virtual learning environment was operated by Lahti University of Applied Sciences.

The purpose of this research is to describe what elements were successfully operated and what aspects will need more careful planning in the future. The main research question contains the whole design of the training courses in the future. Sub questions focus on the experiences and the quality management.

The theoretical part of the thesis presents the main aspects of learning and the variables which have an impact on e-learning. The structure of the e-learning course, pedagogical change, the increasing need of tutoring and evaluation are presented. In this research both qualitative and quantitative methods are used. Methods are content analysis, questionnaire, inquiry and observation.

The results show that despite the cultural differences, the participants were satisfied with the arrangements for the course and they felt that the objectives were achieved. Important aspects which need to be considered more carefully in the future are co-operation and the resources in the project planning. Communication and feedback between the partners is recommended to be planned and organized better. In the end of the thesis the e-learning model, which is recommended to be used in the course planning in the future, is explained.

Key words: e-learning, ICT, virtual learning environment, pedagogical change, evaluation, e-learning model

Lahden ammattikorkeakoulu
Yrittäjyys ja liiketoimintaosaaminen

ANTTOLAINEN, HANNELE:

Verkko-oppiminen ja kommunikaatio opettajien koulutusprojektissa
Case: ADAPTYKES projekti

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TIIVISTELMÄ

Opinnäytetyö on tehty Lahden ammattikorkeakoulua varten. Opinnäytetyön tavoitteena on analysoida ADAPTYKES projektin kurssisisältöä, materiaaleja ja osallistujien kokemuksia. Tutkimustulokset ovat hyödyllisiä projektissa mukana olleille opettajille.

ADAPTYKES projekti toteutettiin yhteistyössä Unkarin ja Romanian yliopistojen kanssa. Tarkoituksena oli kehittää lyhyt- ja pitkäkestoisia koulutuksia paikallisten pienten ja keskisuurien yritysten käyttöön. Projektin pedagoginen suunnittelu ja virtuaalinen oppimisympäristö tehtiin Lahden Ammattikorkeakoulun toimesta.

Tutkimuksen tarkoituksena on kuvailla ne tekijät jotka on hoidettu onnistuneesti ja ne joihin on kiinnitettävä tarkemmin huomiota tulevaisuudessa. Päätutkimuskysymys sisältää koko kurssin sisällön suunnittelun. Alakysymyksillä haetaan vastauksia osallistujien kokemuksiin ja laadun tarkkailun toimintaan.

Teoreettinen tietoperusta esittelee oppimiseen vaikuttavia tekijöitä ja muuttujien vaikutuksia e-oppimisessa. Esillä ovat e-oppimiskurssien rakenteet, pedagoginen muutos ja syyt kasvavaan tutoroinnin tarpeeseen. Tutkimuksessa on käytetty sekä laadullisia että määrällisiä tutkimusmenetelmiä. Näitä olivat sisällönanalyysi, kyselylomake, kysely ja havainnointi.

Tulokset osoittavat, että kulttuurieroista huolimatta osallistujat olivat tyytyväisiä kurssin järjestelyihin ja he saavuttivat tavoitteensa. Tulevaisuudessa kurssien suunnittelussa on enemmän kiinnitettävä huomiota yhteistyöhön ja resursseihin. Kommunikaatio ja palaute osallistujien välillä suositellaan suunniteltavan ja toteutettavan paremmin. Opinnäytetyön lopussa on malli, jonka avulla e-oppimisympäristöjä voidaan tulevaisuudessa suunnitella.

Asiasanat: e-oppiminen, TVT, virtuaalinen oppimisympäristö, pedagoginen muutos, arviointi, e-oppimismalli

CONTENT

KEY CONCEPTS:

ICT = Information and communications technology.

E-LEARNING = Learning supported by information and communication technologies.

VIRTUAL ENVIRONMENT = Web-based learning environment. Also called as e-learning environment.

COLLABORATIVE LEARNING = Learning in groups where social interactions support learning.

CSCL = Computer supported collaborative learning.

LIFELONG LEARNING = A continuous process which stimulates individuals to acquire all the knowledge, values, skills and understanding they will require throughout their lifetimes.

BLENDED LEARNING = Learning environment where different learning methods and virtual environments are mixed together.

TRANSFORMATIONAL LEARNING = Process of learning through critical self-reflection to allow a new understanding of one's experience.

MAKING MEANING = Make sense of an experience. When interpretation guides decision making, then making meaning becomes learning.

FIGURES

TABLES

1 INTRODUCTION

The ADAPTYKES project was based on the experiences of the Finnish workplace development programme Tykes and was carried out in co-operation between Hungarian and Romanian Universities and Lahti University of Applied Sciences. The course content included the tools and the methods that can be used for the workplace development. The purpose of this project was to teach the participants from Hungary and Romania use these methods and work as facilitators in the local companies.

The purpose of this thesis is to find out how co-operation between the Finnish teachers and other participants worked during this project. The structure of the learning course, the virtual learning environment and the experiences of the participants are assessed and the findings are used to create the e-learning model that can be used as a basis for the courses in the future.

1.1 Background

Developing technology and faster connections are changing also the learning environments. Although access to the materials and participating in the courses will increase, it does not mean that education will have the better learning outcomes. There will be more learning possibilities in the future, but it does not necessarily change the required time and effort for learning. Learning is not just memorizing things. It means the understanding of knowledge and using it in practice.

The aim of this thesis is to describe the experiences of ADAPTYKES pilot course at Lahti University of Applied Sciences. The main focus is to evaluate the virtual learning environment in this project, so that it will give information about how the international training courses should be planned and carried out in the future. Many researches have been done earlier among virtual teaching concentrating mainly on the individual learning results and teaching methods. Characteristic for this project was that it was done in co-operation with universities from Hungary and Romania.

ADAPTYKES project was funded with support from the Leonardo da Vinci Lifelong learning programme. Adult learning is recognized to be a good and necessary way to maintain and upgrade skills, in the light of structural changes and technical developments, in order to stay employed. Between 2009 and 2012, the EU adult participation rate in lifelong learning went down 0.3 percentage points. Adult participation in lifelong learning stands at only 9% and is the most prevalent amongst the young and highly educated. For this reason, the country-specific recommendations on the topic of lifelong learning have been issued in many countries. European Union has set the target that by year 2020 the participation of the adults in lifelong learning will be 15%. Some countries are already above this target, including Finland. Hungary and Romania are still below this target. (Education and training monitor 2013, 66-67)

Ministry of Education and Culture has announced in 2009 the strategy of internationalization for academic schools in Finland. The aim is to remove obstacles and weaknesses from international co-operation in the academic world. New kind of possibilities and conditions to create the new collaborative working conditions will be supported in the future. At the same time, the quality of the academic schools and the research will be improved. (Opetusministeriö 2009, 10)

The results of this thesis are used when the planning of the new international courses at Lahti University of Applied Sciences continues. This thesis will help the teachers to understand the special aspects which need to be recognized, when international co-operative learning will be planned.

International co-operation gives a new perspective to the academic schools and its students. Schools are themselves responsible for marketing their educational curriculum and social innovations. The development of training services must be based on the realistic analysis what is the demand and what kind of products are suitable for international co-operation. The export of academic innovations needs co-operation and support from the business organisations. (Opetusministeriö 2009, 40)

1.2 Thesis structure

This thesis includes four main chapters in the following order.

Literature review

The literature review is divided into four main subjects: main aspects of e-learning, e-learning models, communication and contacts and finally evaluation in e-learning. This theoretical part is the review of well-known facts concerning e-learning. Important factors that influence on e-learning are introduced. There are also the models of basic e-learning courses and the research results from other studies concerning studying in the virtual courses. The evaluation part highlights the importance of self-evaluation in the courses where communication and contacts are more limited than in traditional learning.

Research context and methods

ADAPTYKES project as a research context is described at first. Then study aim and research questions are explained with the figure of the research design. In the end of this chapter, there are the research strategy and research methods as well as the data collection and analysis explained.

Research findings

The second chapter of this empirical part consists of the research findings. The results of the questionnaire and the inquiry are classified in themes that have been shown earlier in the theoretical framework. The findings from content analysis and observation are also there.

Conclusions

Finally there are conclusions based on the findings of the research. Answers for the research questions are given there. Also the e-learning model, which is created based on the literature review and the findings, is introduced. The validity and the reliability of this research is assessed in the end.

2 LITERATURE REVIEW

The literature review is based on adults' motivation to learn and achieve the goals in e-learning. It includes the theories of adult learning technics and motivation factors. There are also presented the factors that either are promoting or diminishing the learning experiences. The models of the virtual learning courses are introduced.

The theories of the pedagogical changes are also presented because they are an important part of e-learning. Especially people who will design the virtual courses should be aware of the e-learning specialities, considering the learning technics and guidance during the teaching process.

Motivation, communication and the course content are the main factors which will have an influence on the learning experience in the virtual learning environment. (Figure 1) Motivation is depending on many individual and environmental elements. Motivation to study is mainly depending on each person's own learning styles and how well the virtual learning environment will support the different mixture of learning styles. Learners' own technical skills and earlier experiences in virtual learning will also have an effect on how challenging learning will be.

Communication and contacts between the learners are one of the most important factors in collaborative learning. Communication between others has an effect on the learning results. The structure of the course content and the learning materials can be designed in a way that they will support collaborative learning. The support of teachers and other learners has a significant meaning in the learning experience. Feedback from teachers is not there only for assessing the learning results, instead, it is a way for teachers to guide learners to use their own skills and lead their studies to the right direction.

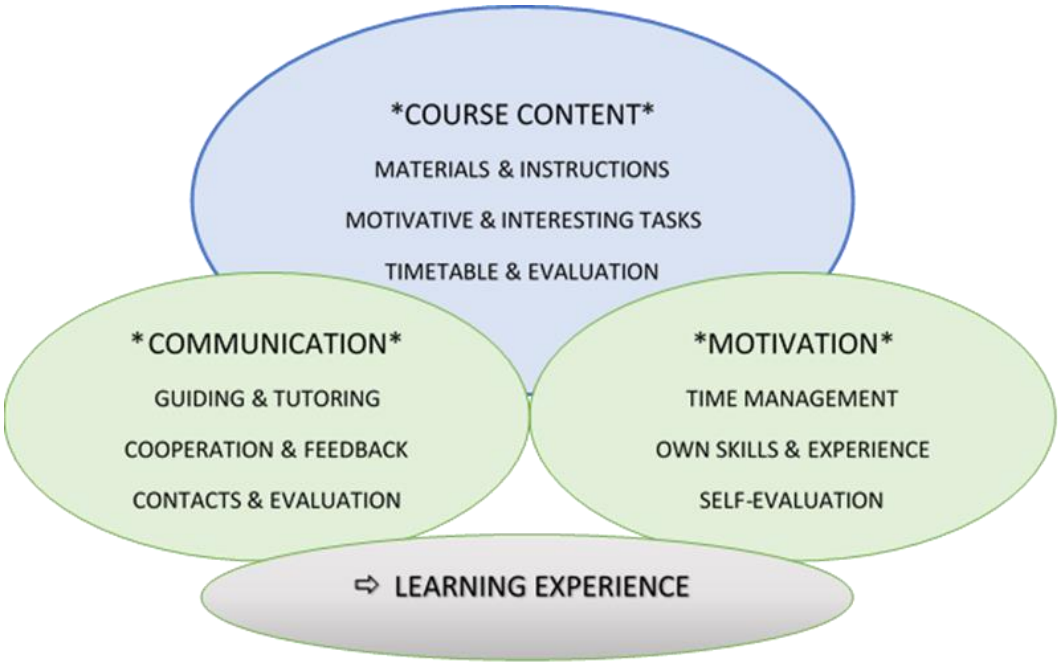

FIGURE 1. Theoretical framework

Evaluation and self-evaluation are presented in the end of this review. Support and guidance are not available in virtual learning in the same way as in traditional learning. Self-evaluation is needed when estimating the learning results. Evaluation is used to understand what learning results are and how all of these aspects work in a close association during the studies. It should be possible for learners and teachers to do self-evaluation. The course content should be evaluated also. Only in this way, it is possible to reform the courses based on the evaluations and keep the quality of teaching on a high level in the future.

2.1 Main aspects for learning

Three most important aspects in learning are goal, content and methods. The virtual environment may change the learning methods, but the goal stays almost the same. It is still teachers' work to motivate the learners to reach their goals and help them to understand and use this new knowledge. Learning in the virtual environment can also be bidirectional. The virtual environment can be useful for the teachers with new ideas and solutions given by the learners. (Mäkitalo & Wallinheimo 2012, 30)

There are some basic elements for learning and teaching. Depending on which philosophical approach is chosen, either the learning methods or the teaching methods are stressed. Helakorpi (2005, 177) presents the figure where all aspects that have an influence on the learning results are shown. He highlights that these are chosen from so many researches that these must be the major factors in learning. (Figure 2)

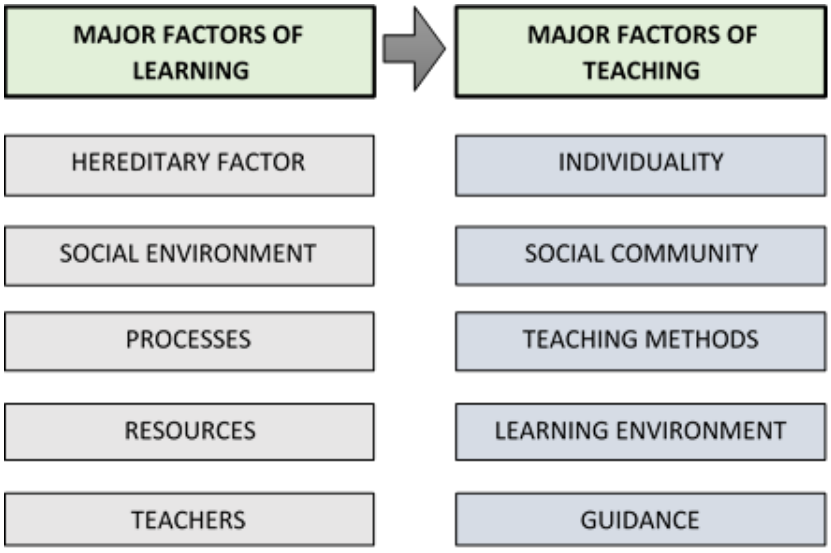

FIGURE 2. Major factors from learning to teaching (Helakorpi 2005, 177)

The most important factor is individuality. People have their own personality, talent and interest. For this reason, teaching should offer many different kind of learning possibilities so that everyone can choose what is the best suitable for themselves. Social and cultural environment are the second important factors. People have been growing up in the different kind of living habitats and their communication and co-operation skills vary. Virtual learning should offer the opportunities to practise these skills. One way is to adapt the issues that has been learnt in the studies into own working environment. In this way, co-operation with the colleagues will improve personal skills. Also face-to face meetings create a feeling of togetherness and will improve communicative learning. (Helakorpi 2005, 178)

Teaching methods are also very important factors in order to have the successful learning experience. This requires the careful planning. Helakorpi says that teachers' part in the actual learning process is not so important after all. They have

a big role in choosing the right resources and the methods though. If this basic work is done carelessly, then it has a large effect on the whole learning process. It has been estimated that 25 % of the learning results are derived from the teaching methods and only 5 % from teachers' guidance. On the other hand, teachers' own activity is directly linked to the teaching methods and the learning environments.

Communicative learning means learning through the discussions and the shared experiences. It has been indicated that this kind of learning is possible only for people who have enough life experience. In the same way, collaborative learning needs social interaction and co-operation inside the group. New technology is increasing possibilities in collaborative learning and the importance of group work is emphasized. (Manninen 2001, 65)

Mezirow (1997, 6) is specialized to study the theories of adult learning. Earlier experienced situations shape and delimit our expectations and perceptions. We have a tendency to reject the ideas that failed and in this way create the frame of reference, which is primarily the result of the cultural assimilation. The frame of reference is composed of two dimensions: habits of mind and a point of view. Mezirow's view of adults' thinking and making meaning describes well what transformational learning is:

> *"Habits of mind are more durable than points of view. Points of view are subject to continuing change as we reflect on either the content or process by which we solve problems and identify the need to modify assumptions. This happens whenever we try to understand actions that do not work the way we anticipated. We can try out another person's point of view and appropriate it, but we cannot do this with a habit of mind. Points of view are more accessible to awareness and to feedback from others." (Mezirow 1997, 6)*

Learning is contextual, in other words, it is understood in the circumstances where it appears. Something in the learning environment influences as a stimulant, and this gives an internal model how to react or process new information. Earlier experiences will have an influence on how we understand the meaning of new

information. This is called constructive learning. It is important that a learner is working actively when creating a bridge between his/hers own thinking and the surrounding real world. In virtual learning, it is important to create the learning environment that will support this kind of learning. One way for that is to create the interactive learning environment where learning situations will be bidirectional and based on dialogue. (Alamäki & Luukkonen 2002, 88; Helakorpi 2005, 172)

The nature of the actions and the learning goals are guiding which teaching methods and technical solutions will be chosen to promote learning. The constructive learning theory is considered the most suitable for virtual learning because it emphasizes the importance of the learners' own thinking. (Mäkitalo & Wallinheimo 2012, 103) The most optimal learning environment will offer pieces of all four different learning environments. These are pedagogical, social, pragmatic and virtual learning environments. This network of the environments gives learners an opportunity to independently choose the learning style that best suits to them. In this way, learning is based on the different levels of the knowledge building. (Helakorpi 2005, 168)

2.1.1 Variables impacting on e-learning

Individual learning is strongly based on the personal factors. These are the ability to control one's own learning and the ability to find yourself the most suitable learning methods. Motivation in learning is a result from each own personal need to develop professionally. Motivation and attitude towards the virtual environment define how successful learning will be. (Korhonen 2003, 133)

The experience and skills to use technical instruments have an influence on motivation. Differences between the young and older adult learners are seen these days. People who have been born at the internet era are more familiar with computers than people who have been born before that. This is also reflected in the learning culture. Goals are still the same but the learning approach and perspective are different. (Mäkitalo & Wallinheimo 2012, 10)

Age is, however, not a limiting factor. As it is shown in the recent research (Leen & Lang 2013, 980) that instrumentality motive can be important in all age groups. Older adult learners care more about the self-oriented aspects of learning and they focus more on the actual learning process. People who feel younger than they are, observe their future more open-ended and this helps them to understand new information.

Despite good computer skills, younger adult learners may face the learning problems in the virtual environment. Two separate researches studied the e-learning courses among the university students. In both studies, it was found out that one of the most important factors delaying the studies were the difficulties to manage the use of time. The isolation and the lack of support were the next important reasons for difficulties in studies. For younger students, it is not familiar to control and evaluate their own learning because they do not have enough this kind of learning experience. (Korhonen 2003, 153; Nevgi & Tirri 2003, 95)

E-learning can be a part of traditional teaching where the virtual environment is seen as an option for face-to-face learning. Then the learning materials are widely available for the learners and allows learning at any time. Though e-learning is considered both time and place independent, it actually is only more flexible. Learning processes and understanding still require time and no technical solutions will free the learners from that. (Mäkitalo & Wallinheimo 2012, 78)

Overloaded working memory can cause problems in virtual learning. If the course content is too complex, then the learner needs to memorize too much irrelevant issues and that will disturb the actual learning process. The learning materials should be planned according to pedagogical rules, in such a way that understanding will develop when the course proceeds. (Alamäki & Luukkonen 2002, 57)

Support from the teacher or other students is important in the e-learning courses. Feedback from the teacher helps to understand learning process and goals. It has an important meaning when students are evaluating their own learning. Feedback gives needed guidance towards the final understanding and gives the tools for self-evaluation. Delays in feedback or the total lack of needed support can cause

anxiety and an interruption. (Nevgi & Tirri 2003, 87) Support from co-learners, on the other hand, offers new perspectives on the learning-related issues. For adult learners, such support and the discussions with others create a feeling of togetherness. It is an important motivator to continue studies. (Nevgi & Tirri 2003, 68)

Also Leen and Lang (2013, 982) are underlining the importance of communication in their research among ICT-courses for adult people. They say that a good support and communication offered in the courses, was increasing satisfaction. Social contacts add commitment to the courses, both in e-learning and in face-to-face learning.

One goal for academic teaching is to create the critically minded students and the learning environment should support this kind of thinking. Conversations in the virtual environment are usually more intensive and better explained than they will be in face-to-face situations. Opinions are prepared longer and with deeper consideration. The opinions expressed will also remain there for later use or to cause further discussions. (Alamäki & Luukkonen 2002, 48)

According to Entwistle (2014, 6) the form of motivation has taken another direction where motivation is affected by teaching and assessment. Teachers who encourage learners to collaborative learning, have had the good earlier experiences or they have otherwise understood the meaning of motivation and its effects on learning. In teaching, there is a need to help academic people, to develop the more sophisticated conception of the teaching-learning process. The suitable conceptual framework should enable them to break out of the traditional views and move teaching from competence to excellence.

Variables that must be considered in virtual learning are collected in table 1. They are helpful when the quality of the virtual learning environment is planned and evaluated. Forgetting some of the important variables consciously or unconsciously, may have an impact on many different aspects which could not been earlier even understood. When developing the evaluation of e-learning, there should be found means to measure all the different variables which will help to prevent the decrease of the quality. In table, there are four different variables

presented that will have an effect on the quality of e-learning. Individual variables are the facts which have an effect on human behaviour during the e-learning. These are physical characteristics, learning history, attitude, motivation and familiarity with technology and the learning environment. The learning environment variables consist of the virtual learning environment and the persons' attitudes towards it. (Attwell 2006, 36)

TABLE 1. Variables impacting on the quality of e-learning (modified from Attwell 2006, 36-37)

INDIVIDUAL LEARNER VARIABLES	LEARNING ENVIRONMENT VARIABLES	CONTEXTUAL VARIABLES	PEDAGOGIC VARIABLES
Physical characteristics (age, physical abilities)	The immediate (physical) learning environment	Socio-economic factors (class, gender)	Level and nature of learner support systems
Learning history (negative/positive, commitment, duration)	The organisational or institutional environment	The political context (financial support)	Methodologies
Learner attitude (positive/negative)	The subject environment	Cultural background (level of appreciation)	Flexibility
Learner motivation (high/low)		Geographic location (country, language, urban/rural)	Learner autonomy
Familiarity with the technology			Selection and recruitment
			Assessment and examination Accreditation and certification

The contextual variables are associated with the social and cultural background. The participants and the institutions which are organizing e-learning may have different positions in the society or the level of education may vary. Geographical location can be an important variable in the technology issues. The pedagogic variables consist of the issues that enable the actual learning process to happen. These are the flexibility of studies, teaching methods and guidance. (Attwell 2006, 37)

2.1.2 Experiences from learners and teachers

One research was studying the capacity of adults' to participate in the lifelong learning process by using the virtual learning technologies. Study shows that if the person has poor computer skills, it will limit his/hers fluent involvement into both the lifelong learning process and the labour market. In these cases, the computer is usually used only for the information search on the Internet or carrying out the job tasks. When they had the previous experience of distance learning, it was based mostly on reading of texts and the assessment of the learning outcomes. Concerning motivation, the results show that those who had the experience of distance learning were more willing to choose the modules of distance learning and they highly evaluated the individual consultations. This indicates that the previous experiences have a positive influence on how new things are perceived. (Vilkonis, Bakanoviene & Turskiene 2013, 185-188)

According to Vuopala (2013, 151-152) collaborative learning depends on the smooth co-operation, shared assignments, the same kind of learning technics and motivation. By organizing the group work together and allowing ongoing discussions, team members are promoting each other's learning experience. Communication in a language other than the mother tongue and passive team members were considered to be a disadvantage. When they were working in the group, the most critical factor for success was a task or an assignment where all participants were involved. This means that also the virtual environment must have sufficient versatile equipment to support this kind of learning.

Barriers that were slowing learning were the lack of time and motivation. Although the students were studying in the virtual courses, they mentioned that because they do not personally know other students, it will have an effect on their learning experience. Along with collaborative learning, the students needed also other mentor or teacher who was available all the time. They wanted also more guidance for the content matters and support for teamwork. (Vuopala 2013, 176)

Table 2 is showing what are the benefits and the possible disadvantages in e-learning. On the left, there are the major factors of teaching which were introduced in the beginning of the literature review. Column in the middle is

showing the benefits which are connected to the efficient virtual learning based on the earlier studies. On the right, there are the possible disadvantages that might occur during e-learning.

TABLE 2. Benefits and disadvantages in e-learning (Murto, Kaunisto-Laine & Korhonen 2007, 102-103)

FACTORS OF TEACHING	BENEFITS OF VIRTUAL COURSE	POSSIBLE DISADVANTAGES
INDIVIDUALITY	Personal skills vary. Time and place free learning.	Insufficient personal skills. Lack of time and motivation.
SOCIAL COMMUNITY	Available to all. Own learning styles.	Technical problems or poor technical availability.
TEACHING METHODS	Versatile selection. Latest information available. New pedagogical challenges.	Needs reform in teaching process. Curriculum needs more time.
LEARNING ENVIRONMENT	Possible to observe learning and different skill levels.	Technical user problems and administration.
GUIDANCE	More intensive individual guidance. Fast information delivery.	Difficult to motivate students. Support is not available.
EVALUATION	Results stay in system. Material reuse and processing.	Learning results versus used time is not optimal.

The research among ICT teachers asked the teachers' experiences of the virtual courses at Tampere University. Time management was also here the dominant factor. The teachers admit that the planning of the virtual course and the curriculum takes more time than in traditional teaching. In the end, this used time was rewarded when they were starting new courses based on the earlier courses. The documentation and the storage capability were allowing them to monitor the whole course. The virtual environment allows to pay attention to the students' different skill levels. The materials were easy to deliver and information to all students was quickly distributed. Teachers' own technical skills can be a problem, particularly if there is no support available in the same working environment. Administration and the local information technology policy might diminish the use of virtual solutions in teaching. New pedagogical changes were seen as a challenge, but at the same time they understood the reform that must be done before virtual teaching can be in general use. It was challenging for the teachers to motivate the students. The teachers felt that the learning results were not good enough, especially, when the results were compared to the time used in the course planning. (Murto, Kaunisto-Laine & Korhonen 2007, 102-103)

2.2 Models for e-learning courses

Success in virtual learning is depending on the co-operation of different experts who are involved in the virtual courses. This includes teachers, students and IT experts. To create the positive culture of virtual learning, the support from management is necessary. There must be the possibility to do experimentations and learn from practice, in order to create the innovative learning environment. (Mäkitalo & Wallinheimo 2012, 39)

Along with the content design, the virtual environment needs the comprehensive method planning. Learners' earlier learning experiences and skills must be considered. The virtual environment can be a content based, task based or problem based learning environment. The content based environment is closer to traditional teaching. There all the materials are collected in the same place and together they form the logical learning content. Learning experiences have not a big role, instead the comprehensive content is more important. The content based environment can be planned as a hierarchical or a module based environment. The module based environment allows to divide the content into smaller pieces. In both cases, learners are expected to study all materials first and do tasks afterwards. (Kiviniemi 2005, 26)

The problem based learning (PBL) is a process that will be operated and is collected in co-operation with the learners. There can be the guiding materials and links where to find information, but the main idea is, that the learners produce all materials themselves. This kind of learning requires more tutoring than the content based learning. In the beginning, the structure of the content is planned but it must be flexible and allow changes during the learning process. (Kiviniemi 2005, 31)

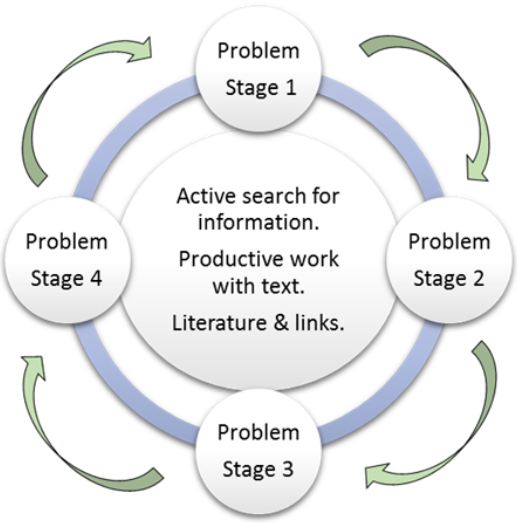

FIGURE 3. Idea for problem based learning environment (Kiviniemi 2005, 32)

The process of the problem based learning is showed in figure 3. In this picture there are four stages, but the number of stages is depending on the problem and how deeply it will be processed.

Jokinen (2006, 18) highlights that this kind of learning is suitable for virtual learning because it challenges the participants to work actively and the responsibility of the learning results is transferred to the learners. Usually the process begins when the well-known or common problem has been identified. Learning is the process, which fixes or finds new approaches to this problem. The second stage is to gather all ideas and experiences regarding the problem. Then new ideas will be recognized and the learning goals will be set. The third stage consists of both individual and team work, where new information is collected from different sources and the overview of the results is produced. These results will be organized at the fourth stage and after that they will be a basis for a new start.

The virtual learning environment can be understood also as a product or a process based environment. The product based environment is prepared in advance by teachers. The process based environment is prepared during studies and needs guidance from the teachers or other responsible persons. In the real world, usually both approaches are in use. (Helakorpi 2005, 185)

2.2.1 Virtual environment planning

CSCL (computer supported collaborative learning) is an e-learning process where the study content is used in the virtual environment with a support from teachers or other tutors. The content based environment does not mean that earlier materials can be posted without modification into the new virtual environment. All materials must be prepared and make them available by computers. When the studies start, teachers' role is to motivate and guide students to use these materials. They need to inspire the students to collaborate because learning is based on the interactions among the students. For this reason, the planning of the virtual environment requires the skilful coordination of the curriculum, pedagogy and technology. (Stahl, Koschmann & Suthers 2010, 6)

The virtual course planning requires pedagogical and technical competence. The technical concept contains e.g. applications and platforms. Support for the use of pedagogical methods must be known. Media elements that will be used, need to be easy to use and suitable for the chosen technical environment. The pedagogical competence is necessary to be available in order to ensure that the correct teaching methods are used. The learning goals and the indicators for the learning results must be planned in the beginning. Before the learning goals can be set, the target group and their special needs must be identified. The learning goals are depending on the wide of the studies and time management. Benchmarking may save preparation time in the course planning if the earlier used practices can be copied. (Alamäki & Luukkonen 2002, 188):

When pedagogical and technical solutions will be chosen, the personal resources and the learning objectives are the ruling factors. Then it must be considered, what will be the most reasonable way to carry out the virtual learning course. Target groups change and therefore teaching materials may vary. Digital learning materials should be planned in a way that they will support learning in a genuine context. It will be good if all possible media elements can be utilized. The structure of the materials will effect on learners' learning attitude and the materials also show the learners what kind of skills are needed to pass the course. (Mäkitalo & Wallinheimo 2012, 38; Alamäki & Luukkonen 2002, 89)

According to Alamäki and Luukkonen (2002, 99) the following instructions should keep in mind when strengthening the learning process. First of all, the learning materials should contain the same symbolic components than there will be in the real life situations. The repetition of the tasks and the adaptation of these materials into practice will enhance understanding. Secondly, different approaches and situations should be presented in a way that in the practical situation, the new knowledge will be connected to the situation in question. Thirdly, the virtual course should be planned in a way that at first the learners understand the whole content of the course. This can be called as the big picture. After that different approaches and possible technical solutions are shown. All new information must be a part of the big picture. A bit of information without the context is irrelevant and useless for learners. The adaptation of the theoretical information in practice is an essential requirement for learning. It is important to observe what will be the most interesting areas to learners and what kind of issues they consider to be meaningful for themselves.

The learning process will have an effect on what kind of virtual environment should be built up. It should be clear to understand and simple enough to use. This must be considered especially if the learning content is demanding and complex. The use of technological solutions enables to control the resources in the most beneficial way. However, all technical solutions are not suitable for promoting the actual learning process. For this reason, the virtual learning environment must be carefully planned. When the curriculum is flexible enough, changes can be done if virtual teaching is not working in such a way as it was planned. (Mäkitalo & Wallinheimo 2012, 21)

Peoples' learning styles are classified as visual, auditory and kinaesthetic. The ideal learning style is a part or a mixture of all these. For this reason, it is important that the study content is versatile, motivating and inspiring. Knowledge has to have a meaning and in a good digital material the learning process will proceed like a narratively growing dramaturgy. The pedagogical structure will define what the best way is to create the virtual environment. Basis must be the inspiring learning environment that encourages thinking and problem solving. (Alamäki & Luukkonen 2002, 94 – 96; Lallimo & Veermans 2005, 57)

One of the key issues is to find the solution to the problem of how the materials will be adjusted in such way that they are usable for different kind of learning styles. Learning style is a way how the learners perceive and process information in different ways. When recognizing the individual learning style, it will improve the quality of the e-learning content, making it more appropriate for each learner. (Buthaina Deep & Bin Hassan 2011, 7)

When using materials from the earlier courses, it is important to take into account the new challenges. The best practices that have been used earlier cannot be copied directly. It is important to check the pedagogical structure and modify the course to be suitable for the current situation. Certain arrangements can have either positive or negative impact. Time planning is one them. Deadlines are helpful for some people when they are planning their studies, but others feel that they are being put under pressure. Also online discussions and to publish their own work are factors that need to be considered. The structure of the virtual course should allow alternative working processes. In this way, the best learning environment for all kinds of learning styles is created and learners' individual learning styles are supported. The pedagogic infrastructure allows teachers to observe the functioning of the different areas in the virtual environment and compare these between each other. (Lallimo & Veermans 2005, 62)

TPACK model (Figure 4) shows relationships between three forms of knowledge: pedagogical, content and technological knowledge. It is useful for teachers and other people who are planning the virtual courses. By using this template, it is easy to describe what parts will be in use when the idea of ITC is in the curriculum. The content knowledge (CK) means documents, learning concepts, communication and other processes in the curriculum. The pedagogical knowledge (PK) is about the strategies, techniques and environments. Digital and non-digital technologies and tools are included in the technological knowledge (TK).

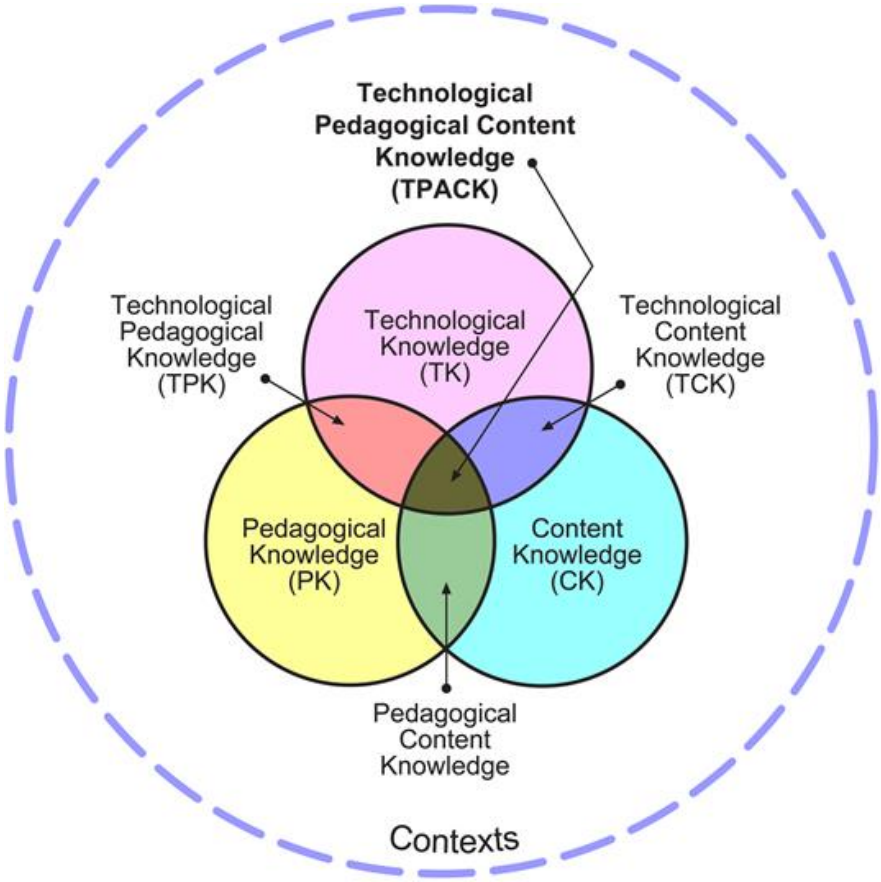

FIGURE 4. Technological Pedagogical Content Knowledge (TPACK 2010)

It must be understood that the planning and new ideas are not happening only in the middle of the diagram. As it is seen, sections where two forms of knowledge are joining are important as well. The pedagogical content knowledge (PCK) helps to understand what kind of teaching approaches fit into the content and what the learning expectations will be. When you consider how technology will effect on the curriculum, then the technological content knowledge (TCK) is in use. If technology is supporting special teaching strategies or new pedagogical approaches are considered, then the technological pedagogical knowledge (TPK) is in use. (TPACK 2010)

2.2.2 Pedagogical change

The development of teaching has not been very active at the universities at the beginning of the 21st century. The development is focused more on research activities. The research activity has been highly recognized because the merit of

the research will help teachers to advance their careers and it has effect on learning culture. Working culture of the academic school is created by teachers, learning groups, management and administration. Teachers who are working in the different positions, have not alone possibilities to influence on working culture. The academic people are used to work alone and they are recognized as the experts of their own field. An academic employee who concentrates on teaching at the expense of research risks his/hers career prospects. This kind of culture is not optimal for cultural changes. The hierarchical system and the positions of power are slowing the development. (Korhonen 2007, 33; Price & Kirkwood 2010, 779)

Networking and relationships with other experts are a common practice in the business world. This business model is gradually moving also to the schools. Nowadays teachers are working more and more in teams and groups. This requires more dialog and the collective teaching methods. Teachers' new role is to organise and supervise teaching, networks and other activities. At the same time, certain criticality and continuous monitoring, which is essential in teachers' occupation, must be kept alive. (Helakorpi 2014, 11-12)

The increasing use of ICT in teaching calls for new social innovations. It means the acceptance of the digital environment so that it allows for the replacement of the old functions in the new learning strategies. The pedagogical development has usually accepted new media as a solution for problems. Yet the wider understanding of the pedagogical development has been missing. The need of the development will be understood when using social networks and working in the different kind of collaborative processes. Specialized knowledge is required and it is shaped only if the right people and their competences will meet. New social innovations will spread if there are functional networks, co-operational virtual learning and trust between different workers. While teachers' work is mostly lonely, it is understandable that the changes in the academic culture will happen slowly. (Murto, Kaunisto-Laine & Korhonen 2007, 82-84)

According to Price and Kirkwood (2010, 778) various researches have shown, that innovations which were designed to promote the teaching practices, has not done that. One of the main findings was that the innovations had increased the

flexibility for students, but it tells nothing about the changes or the improvements in students' learning. Only in a few cases, there were the results that the innovation had influenced on the subsequent practices. There has been the insufficient examination of the pedagogical issues while most of the studies have concentrated on the technical solutions. It is still uncertain, if there is an evidence about the changes in the teaching practices, but it is not available on the mainstream journals due to constraints that journals place upon the researchers. (Price & Kirkwood 2010, 778)

Teachers networking inside or outside their own unit will develop the teaching processes. Co-operation with others and shared projects diminish suspicions. By lowering the hierarchical structure, a new kind of culture can be created, which offers space for new ideas and innovations. This is called as 'a moving mosaic culture'. (Korhonen 2007, 36) The pedagogical development can also be done at teacher's own school by observing the lessons of other teachers and later with discussions about the expectations and the experiences. This is called as 'a scholarship of teaching' and here the goal is to study and develop teachers' own competence with the help of the colleagues. The main idea is, that the respect of the academic teachers will be improved and their expertise will be recognized as the key factor in the academic community. (Korhonen 2007, 12)

Research among the university teachers in 2007 shows that only a few of them have produced their own learning materials to the virtual use, although most of them were using the virtual environment in their teaching. Mainly they delivered materials such as texts, slides and videos. Simulations or shared representations were not in use. This shows that the virtual environment was used only for delivering tasks to students. (Murto, Kaunisto-Laine & Korhonen 2007, 94)

In virtual teaching, teachers' new role and the pedagogical development have been forgotten while the focus has been on the technical solutions. A self-learning organisation, blended learning and shared expertise are only the theories which have been written, but rarely properly researched. Few researches that have been done, show very positive results but that will be explained mostly by the sophisticated students and novelty. (Helakorpi 2005, 170) It is not possible to define what is blended learning and what is not. Almost all kind of mixed learning

methods and teaching models can be called as blended learning. This term has unnecessary hype around it. This concept has been criticized that it is indefinite and too difficult to understand. (Levonen, Joutsenvirta & Parikka 2009, 17)

The factors that prevent teachers to use virtual teaching are insufficient skills in technological and pedagogical training and the lack of confidence in these matters. The availability of the suitable educational software is a problem. Personal, institutional and technological factors are related to each other. For example teachers' knowledge and attitudes influence on their use of ICT in teaching. Also the professional development and desire to develop are the key factors in successful virtual teaching. If technology is easy to use and it can be tested before the final adaptation, then it likely will be chosen. (Buabeng-Andoh 2012, 147)

According to Korhonen (2007, 59-60) there are some new competence areas that are needed in virtual teaching. The understanding of the presence and the awareness of the surrounding reality mean that teachers have to accept that technology is changing the teaching processes. Virtual network knowledge and media choice are connected to teachers' understanding and they will show how technology can support the learning processes. Teachers' own interest to develop is affecting on how successfully new technology is used in teaching. The role of pedagogue and the awareness of the changes are a part of social and cultural changes, which are happening in the society all the time. Teachers are no more the only source of information. Instead of teaching, their role is to show students how to use skills and information in practice. Change management and new media adaption are a part of teachers' professional competence. In this way, they can develop their own teaching environment and at the same time, it shows that they are prepared for the challenges coming from the information society.

The pedagogical development with new media adaption will describe best how teachers' professional competence is developed. It also shows that the teachers are the experts and the role models in lifelong learning. Working in the virtual network allow teachers to create their own work in a way which will be based on their perceptions of the learning. At the best, the use of virtual teaching is showing

that the teacher is a very supportive person and not just an experienced authority. (Korhonen 2007, 61)

The changes in teachers' roles are also seen in the terminology. Teachers are called more often mentors or tutors. Traditional teaching requires the understanding of the practices on a specific field in order to provide sufficient guidance to learners. Virtual learning requires on top of that the change management and the ability to make the reforms. Guidance is changing from the content controlling to tutoring in self-learning and the responsibility of learning is mostly passed on learners. (Helakorpi 2005, 222)

Virtual learning and teachers' competence was studied at Tampere University between 2005 and 2006. Based on experiences, they started the discussions how the academic culture should be developed. The change management and the structural changes are perceived as very challenging. The social actions are divided into two categories: strategic and communicative actions. Strategic action means that the utilization of people are used only to gain one's own aims. Communicative action appreciates other peoples' competences and aims at the agreement. Working under pressure or the competition may tempt also the experts to use the strategic actions though the communicative actions are more ethically recommended. As the result of the experiences, it is still uncertain if changes in academic culture are possible and do the teachers feel that they need more communality at their work. (Korhonen 2007, 37)

Teachers who participated in the virtual teaching courses found out that the technical problems were taking too much time from the actual content planning. Being dialogical and tempting students to take part in the conversations was challenging. Conversations will need the exact planning. There must be a given subject, time limits and a responsible person to gather the arguments. Teachers who have had the previous experience in the virtual courses managed better on these matters and it was also seen in time management. Teachers felt that they were more tutors than teachers because guidance played so important role in teaching. Their opinion was that virtual teaching is suitable for inquisitive and self-oriented people because learning in these courses requires more time than in traditional learning. They felt that the virtual learning environment offered more

possibilities to use materials than the traditional learning environment. (Jokinen 2006, 14-15)

Support from mentors or tutors who come from the business world, can be one solution when plans for virtual learning will be done. When the mentor is coming from the specific area of the working life, this person will share his/hers own experiences with learners and can work together with teachers. In this way, the teachers will be responsible for the pedagogical planning and the mentors take more responsibility on the issues related to the work practices. Learners' competences are supported and the relationship between new knowledge and the practices of the working life is created. Feedback given by the mentors will help the learners to understand solved problems better. The interaction of the working life is the basis for networking that will benefit all participants. (Oja & Lokasaari 2005, 148)

Teachers will have more time to use for guidance and personal feedback when they are working with mentors. There are some challenges though. At first, the use of mentors is depending on the financial resources. Secondly, it is not easy to find the mentor which has the necessary expertise, interest in mentoring and enough time for this kind of work. It will be also challenging for the teacher and the mentor to work as a team. It requires respect and understanding of each other's professional competence. When this kind of teaching arrangement will be created, it will take some time before the best practices are learnt. (Oja & Lokasaari 2005, 161)

If co-operation is working well, it is also productive for mentors. The end result may be that the mentors will learn about new innovations or, at the very least, they participate in the development work. Co-operation among the participants can add new contacts that can be useful in the working life in the future. The future prospects can be harmed, if there is a conflict between intellectual property rights, or for the commercialization of innovations. The mentor should be involved into the process so intensively that these problems can be avoided. (Leppilampi & Neuvonen-Rauhala 2007, 331)

2.3 Communication and contacts

There are some interesting results regarding the network conversations among the university students. Research shows that the students had taken part in the discussions only in order to meet the requirements and pass the course. Such actions are not conducive to the actual learning process. The collaborative learning environment must be accompanied by the teacher, who will evaluate the various opinions and gather information from other sources. New information is then built based on the opinions of the participants. This will help learners to understand the new theoretical insights and apply them to their own practices. The aim of the conversations is to make the students to understand things in different perspectives. (Lallimo & Veermans 2005, 46)

Network discussions are not always considered to be useful in the learning process. Learners are more likely to be involved and will follow the discussions, but only in order to gather new information. Discussions with teachers are considered more helpful than the discussions with other group members. (Tenno 2011, 158)

Tracking tool is an easy way to check learners' activity in the virtual environment. The teacher of one blended learning course was surprised how big differences there were among students. Using the tracing tool, the teacher can increase guidance for learners who will need it. Minimal participation can be a sign of problems and it is teachers' role to find out why activity is low. For some people it can be only that their learning styles are different and they would prefer to talk in the classroom than in the e-learning environment. (Venn 2009, 152)

Discussions in the virtual course give each learner a possibility to join in conversation. The situation is different in the classroom, where the answer is given by one person and after that a different point of view is asked. Usually in the classroom you do not repeat the same opinion but you have to figure out something else to say. In virtual discussions, you are allowed to express your opinion with your own words though similar opinion had been expressed earlier. (Venn 2009, 156)

One of the teachers' main task in the virtual environment is to support learners in the understanding of new issues. At the same time, the teachers are operating as content experts as well as learning experts. The challenge is to estimate how to give support to the learners in such a way, that the goal is reached. The responsibility of understanding and learning belongs to the learners and the teachers cannot give ready answers, only guide to the right direction. This kind of guidance together with the information of related sources, will strengthen self-oriented learning and is seen as an advanced e-learning activity. A summary of conversations and quality evaluations are seen to be closer to the traditional teaching on the learners' point of view. (Lallimo & Veermans 2005, 52)

Communication and support in the virtual courses compete with e-mails. The research has shown that most of the students were expecting information by e-mail. It will be a big challenge in the future to design the virtual learning environment which will ensure needed support for students. Activities learnt in the working environment may be a reason why e-mail is considered as the most important communication channel. Activity in the virtual environment was related with performed tasks. It looks like that students are not using the virtual environment unless there are tasks which require communality. (Tenno 2011, 196)

In collaborative learning, learning is analyzed as a group process as well as an individual learning process. Previous studies on group learning treated learning as an individual process. In computer supported collaborative learning (CSCL), learning is also analyzed as a group process. To support the knowledge building we need to understand how groups are functioning and how learning is produced. There is not enough evidence on that because the analysis of meaning making have been concentrating on what people are doing within interaction. To study the learning outcomes in collaborative learning, there should be a symbiotic relationship between analysis and design created and both should be studied at the same time. The scope of the research will be shifted from a narrow focus on individual learning to an incorporation of both individual and group learning. (Stahl, Koschmann & Suthers 2010, 15)

Some results of co-operation between universities were introduced at the conference at University of Tampere in 2009. In this case, pedagogical expertise

together with ICT technology and educational expertise formed the international group of experts, which contributed at the different stages of the process. These schools had designed the e-learning course which included the pedagogical framework and the modules of blended learning. The students who were participating were asked their opinions before and after their studies. Before studies the students have found it very important, that during the course there will be possibilities to be involved in the practical work and study in the authentic environment. To study independently was not very meaningful for them. They were expecting support from teachers and more than half of them did not make the personal study plan. Towards group work and problem based learning in the virtual environment they had positive expectations. After studies the students showed high motivation. About 10 % of the students did not work alone at all during the study module and 3 % of them announced that they were not working in groups at all. Most of the students found valuable to have face-to-face teaching but 11 % of the students did not see it necessary at all. Guidance came from the peers and the teachers of one's own university. Guidance from the other universities' students were not seen very important. After studies their skills were on the average level according to the students' own assessments. (Viteli & Östman 2009, 144)

2.4 Evaluation in e-learning

According to Alamäki and Luukkonen (2002, 46) the learning outcomes are depending on two different things, pedagogical approach that has been used and the content of the learning materials. The most promising development areas of e-learning are the content management and the quality of the learning content. There will be improvements in areas like real time operations, collaboration and the global availability. Reason for that is learners' easy access to materials and information that is correct and updated through the web. According to the reports, the second most developing area will be the activities which will respond to the demands and preferences of students. (Kakoty, Lal & Sharma 2011, 146)

New virtual teaching models are requiring new kind of skills, media skills. Virtual teaching, planning and evaluation requires know-how in the use of the media and

the ability to share information in the virtual reality. A big challenge is to connect together the pedagogical competence and technical environments. The use of ICT in teaching is a developing trend, where various technical solutions are tested in order to ensure that they can be used in teaching. (Ruokamo, Tella, Vahtivuori, Tuovinen & Tissari 2011, 11)

When students were assessing the virtual environments, they hoped that the virtual environment will follow the structure of curriculum. A wide range of learning content should be organized in folders and the use of visual mapping was preferred. The new material should be separate from the old material when the content is reformed. For students, the virtual environment was mostly for information retrieval. The execution of the learning objectives, was easier for students who were visiting the virtual environment more actively than others. (Tenno 2011, 181)

To observe learning in collaborative situations is more difficult than observing learners' individual results. Collaborative learning is not a long term process and participants' learning is based on the mutual agreement which is the result of shared tasks and conversations. In these situations the learners express their understanding mostly by supporting others' opinions. It is in principle easier to study learning in groups than individuals' learning, but it does not tell us how an individual learning process has succeed. (Stahl, Koschmann & Suthers 2010, 12)

One research has studied students' self-evaluation in the virtual environment. Study shows that students' attitudes were more positive towards the online evaluation than the traditional paper evaluation. The virtual evaluation is useful when there is a large group of students. Feedback from the teacher will support learning and the learning process is visible for the teacher better than in the classroom. It is also a part of the quality management when the information of the learning results is gathered and evaluated. (Halonen 2003, 93-95)

The research among higher education students' stresses that the regulation of motivation is crucial in socially self-regulated learning because motivation is constantly shaped and reshaped as the activity unfolds. Study shows that the students experienced more challenges because of different personal priorities in

the beginning of collaborative work. It was seen that the students activated a variety of socially shared motivation regulation strategies, of which the social reinforcement and the task structuring were the most common. It was also seen that the students shaped their use of motivation regulation strategies to fit specific situated challenges. This study shows that the motivation regulation can be identified as a socially constructed activity. However, in an attempt to evolve our thinking of how motivation is socially constructed, methodological solutions play a major role. (Järvelä & Järvenoja 2011, 368-369)

Evaluation is moving towards self-evaluation and peer evaluation. It has very important role for students who want to develop their learning skills. While learning in the virtual environment is more flexible, also evaluation must be more flexible than in traditional learning. E-learning is mostly a part of blended learning where tasks, groups and learning styles may vary. For this reason e-learning should be evaluated on all these levels. A part of the evaluation is those levels' connection to the social and cultural aspects. To understand a phenomenon behind this development, the history of learning processes must be known. Quality is depending on the situation, time and the context where it appears. It is the relation between the goal and the result of actions when the goal is reached. In e-learning, the goal is mainly understood as the learning results. While there cannot be quantitative measurements, the quality is measured by examining the methods used to correspond to the criteria that have been created in the past. In e-learning the most important factors are communication, communality and participants' roles in this concept. The criteria used in the quality control should be also used in the course planning. (Ruokamo et al 2011, 12)

A good virtual material is necessary for learning but it is not a guarantee that learning in the virtual environment will be successful. A learning process is happening when materials are used. Support in the learning process has a significant meaning on how good quality the teaching process had. The criteria of quality is determined separately for each organization. Generally the criteria of quality are concerning the course planning, teaching, support and assessment. There are seen some movements that the actual learning results and the experience of the students will be added to the criteria. (Sariola & Evälä 2005, 6)

ISOverstas is an internet site which is created to support students and teachers. There are tools and information about how to develop virtual learning and competence that is needed in new learning styles. (ISOverstas 2015) There is available a criteria for virtual teaching which can be used as a model also in organizations. At schools this criteria helps to evaluate the virtual courses and the learning results and on the organization level this criteria is defining the different roles of people in the virtual environment. (Isoverstas 2012, 4)

Examination areas are 1) competence 2) content 3) guidance and 4) administration and technology. Quality monitoring is targeted separately to teacher, school and organization. There are questions about each of these areas which will help to monitor quality. For example, questions for teachers' quality monitoring are:

- Are your skills at information technology up-to-date?
- Are your teaching methods in the virtual environment up-to-date?
- Do you have the latest knowledge on your study subject?
- Do you respect your colleagues' competence?
- Do you have interest for networking and share your expertise?
- Do you benefit all offered pedagogical and technical support?

A teaching content includes questions about a curriculum, learning goals, a scope of teaching and how new knowledge is strengthening previous information. The structure of the course ought to be clear and there should be guidance for extra information. Materials and tasks in the virtual course should be repeatable. It is important to evaluate how wide range of materials are produced by students and how big part of learning was based on the group work. While the focus on the material check is mostly to update them, there must be also the critical assessment of reliability, especially towards the sources which are provided by outsiders. The course content can be estimated also how inspiring, versatile or visual it is. Feedback from the students concerning the course materials may be asked and the teachers can use this information when they are reforming the course content. (Isoverstas 2012, 5-7)

The quality criterion of guidance is observing the possibility of students' self-control and self-oriented learning. The learning tasks and their guidance must be

clear and easily accessible when the learning begins. The learning tasks are guiding students through the study content and therefore there should also be information on what are the requirements to pass the course successfully. If there are required interactive activity then the materials must also support this type of activity. There should be the guidance for the pedagogical issues as well as for the technical issues. The technical environment and its usability must be known by the teachers and they should be able to help the students if problems occurred. The versatile use of tools and how well they fulfill the pedagogical need can be assessed. When assessing the guidance, the need for different kind of learning styles and learning skills must be considered. (Isoverstas 2012, 7)

The quality criteria of administration and technology include an assessment of how well the studies correspond to the curriculum and technology. Technical demands should be so low that all participants have an opportunity to take part in it if they want. Human resources and other expenses which are required in the planning and in teaching must be estimated and verified. Co-operation between all participants is an essential part of the estimation. (Isoverstas 2012, 9)

3 RESEARCH CONTEXT AND METHODS

ADAPTYKES project is introduced in the first chapter. Study aim, research questions and research methods will follow. Last two chapters include the data collection and analysis.

3.1 ADAPTYKES project

ADAPTYKES project analysed the adaptability of the Finnish workplace development model and methods in Hungary and Romania. Purpose was to develop both the long and short term training for the local SME managers in these two countries. Main objective was to develop SME-related curricula of the innovation receivers by adapting LUAS education in the field of sustainable workplace development. (ADAPTYKES 2013)

ADAPTYKES project was carried out in co-operation with Budapest Business School (Hungary), Babes Bolyai University (Romania), Lahti University of Applied Sciences (Finland), Budapest Chamber of Commerce and Industry (Hungary), Employers and Craftsmen Association Cluj Napoca (Romania) and New Mind S.A. (Belgium). Project management was operated by Budapest Business School. Finnish partner worked mostly on pedagogical issues and created a virtual learning environment. The quality monitoring for the whole project was done by New Mind S.A. They were monitoring risk assessment, critical success factors and associated key performance indicators (KPI).

Project started on the 1st of December in 2012 and was planned to end on the 30th of November in 2014. Due to the great amount of work and delayed processes the project got three months extra time and was ended on the 28th of February in 2015. Project was funded with support from the European Commission Lifelong Learning Programme.

The training programme was planned by Lahti University of Applied Sciences and consisted of three types of elements. (Kotonen, Kuusisto & Savonen 2014, 1) Project was operated mainly by two teachers from Lahti University of Applied Sciences. They were responsible for the pedagogical planning and teaching. Other teacher was also operating as the project manager in ADAPTYKES project.

The structure of ADAPTYKES project

At first there were study visits for Hungarian and Romanian future leader trainers. These included introduction to the Finnish workplace development programme (TYKES Programme) and to the advanced work-oriented teaching methods used in the Master's degree programmes and workplace development projects at LUAS. The second part was trainers' trainings in Hungary and Romania which included two types of activities: face-to-face trainings and online tutoring. (Kotonen, Kuusisto & Savonen 2014, 1) Times and places for the trainings and the partner meetings were:

18 January 2013	Prepatory visit - Lahti, Finland
24-25 January 2013	Kick-Off meeting - Budapest, Hungary
18-19 April 2013	1st partner meeting / Study visit 1 - Lahti, Finland
10-11 October 2013	Study visit 2 - Lahti, Finland
4-5 November 2013	Trainers' training - Cluj-Napoca, Romania
7-8 November 2013	2nd partner meeting - Budapest, Hungary
27-28 January 2014	Trainers' trainings –Budapest, Hungary
28-29 April 2014	3rd partner meeting - Cluj-Napoca, Romania
25-26 September 2014	4th partner meeting - Lahti, Finland
22-23 January 2015	Final meeting - Budapest, Hungary

On study visits 1 and 2 at Lahti there were people from Finnish companies taking part in the project. Their role was introduce how different development methods have been used in their companies. They were also telling about the difficulties of implementing new systems and how the employees can be committed in the development process.

Finally there was the completion of the special coach guide. This summarizes the different pedagogical and methodological backgrounds as well as the methods and the best practices used in the project in written form. These methods have been used in the past in Finnish companies, in the projects which has been funded by Tykes.

The virtual environment of the coach guide and the e-learning studies were created to the LAMK Reppu web site and all partners had access to the e-learning platform. Usernames and passwords were send to all partners before the end of November in 2013.

3.2 Study aim and research questions

Approach for the research is how communication will promote adult learning in the e-learning course. As it is a known fact that there will be less communication with other learners, it is still uncertain if this has an effect on the actual learning process. Contacts and discussions with other learners can add the knowledge of different approaches and this can provide the wider learning experience. If the learning content and materials are well designed it is assumed that all the learners will have the same learning experience and the same learning results.

The aim of this research is to find out what things were successfully operated and what aspects need more careful planning in the future. The research is analysing ADAPTYKES project's course content, materials and experiences.

The main research question includes the whole planning of the training course in the future. Sub questions focus on the experience of the trainers in this project and quality control. Research questions are:

How should international e-learning projects be planned concerning co-operation between academic trainers and SMEs?

1. How did trainees manage with self-oriented ADAPTYKES studies and what kind of support was available from ADAPTYKES project's quality people?

2. How should international collaborative e-learning courses be improved in the future with the given knowledge from ADAPTYKES pilot project?

The research focuses on co-operation between Lahti University of Applied Sciences and trainers from Hungary and Romania. Also quality monitoring is included as far as it had an effect on the course content or learning progress.

Research design is shown in next figure. The e-learning model is created by the literature review and the research findings. This model will be used as a guideline to understand the special factors that are involved in the e-learning course and in virtual learning.

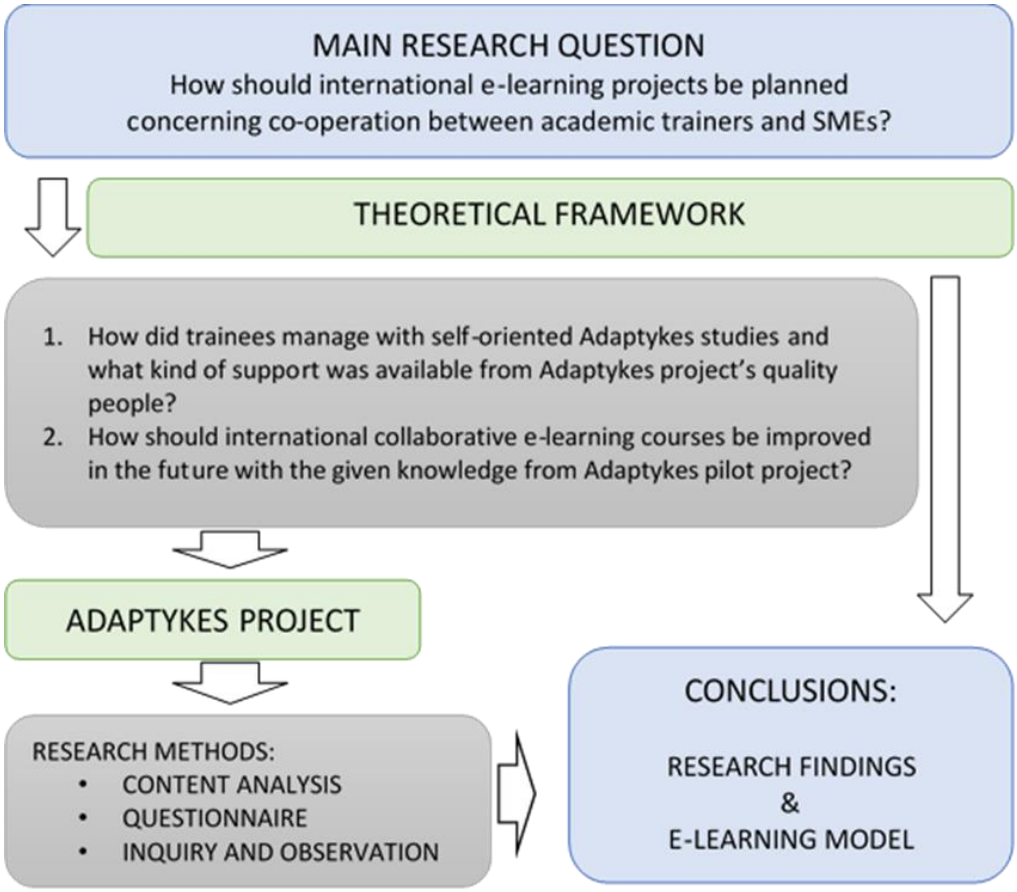

FIGURE 5. Research design

The theoretical part of the thesis is showing the main aspects of e-learning and the findings from the research will be compared with these. The e-learning model which is created based on the literature review, helps to understand the big picture and the relations among the researched phenomenon (Hirsjärvi, Remes & Sajavaara 2012, 146).

Although some of the theoretical part in this research is based on the learning methods and pedagogic, all the educational systems in each country are excluded. All participants are educated adult people so their background is approximately the same. Understanding and the knowledge of how to use new information is already well developed among these academic participants.

The virtual environment of ADAPTYKES project was Reppu web site at Lahti University of Applied Sciences in Finland. It is a Moodle based learning environment but in this research all technical solutions are delimitated. While this research is mostly based on communication and the learning methods in e-learning, it has no relevant meaning how the technical arrangements are resolved. There was also a web site called Coospace at Budapest Business School in Hungary where the partners saved the assignments and other course materials. Some of these materials are used in content analysis but due to language problems the most of these materials cannot be used in this research.

This research will be useful for the teachers who were organising the training course and teaching in this project. It is also possible that when international co-operation between different countries will develop, the findings of this research can be used when the planning of new courses or other co-operational activities will start. The e-learning model will help the course planners to observe the whole course structure. It is very useful, especially, when the communication plans and tutoring are designed. If different parts of the model will be operated separately by each partner, this model shows when evaluations should be done in order to keep the quality of learning in a good level.

3.3 The research strategy and methods

Research strategy and used methods are depending on what is the research problem (Hirsjärvi, Remes & Sajavaara 2012, 132). This research is a case study. Characteristic for the case study is that there is a small target group, the materials are collected by using several methods and the aim is to describe a phenomenon (Hirsjärvi, Remes & Sajavaara 2012, 135).

The research can have more than one perspective. A descriptive research strategy will be used when data is precisely documented. An exploratory research strategy is looking for answers to the situations or the problems using causal relations. (Hirsjärvi, Remes & Sajavaara 2012, 138-139) The descriptive research strategy is useful for this research to achieve the wider understanding of the course content and its usability. By collecting information from the target group and analysing the results mean that this research has also an exploratory approach.

Methods used in this research are the combination of qualitative and quantitative methods. Used methods are content analysis, the questionnaire, the inquiry and observation.

Content analysis includes the materials on Reppu web site, some e-mails between the partners and some face-to-face teaching materials. Content analysis is used to create the picture of what kind of learning environment there was. It is used to compare the differences and the similarities between information given by the literature review and the ADAPTYKES documents. The use of already existing materials when there are no statistical documents is a qualitative method (Eskola & Suoranta 2008, 118).

Participants' experiences were asked in the questionnaire. (Appendix 1) This was chosen to ensure that the respondents have enough time to answers the questions. Because the participants were from Hungary and Romania the questionnaire was easy to organize so that it will reach everyone. The questionnaire inquired their individual learning motivation and how they felt that the course content and the guidance was promoting their learning. Questions shall be based on the theoretical framework so that the outcomes will give the answers to the research issues (Tuomi & Sarajärvi 2013, 75).

The inquiry was sent to Finnish teachers and the quality people. (Appendix 2) Open questions were designed based on the same aspects as they were on the questionnaire. The main purpose of these open questions was to find out the individual experiences of teachers and the quality people in this project and how well these will be corresponding to the answers from the questionnaire.

The observation was done during the partner meetings in Lahti and in Budapest by following the meetings and discussions.

3.4 Data collection and analysis

The research process was divided into two main phases. The first phase was to collect the most relevant academic literatures and studies which are related to virtual learning and the e-learning materials. The second phase was to carry out the empirical part of the thesis and compare the results to the information presented in the literature review. Different themes collected from the research data will highlight the actual research problem and these chosen themes can be compared with the collected data (Eskola & Suoranta 2008, 174).

Course content analysis

For the content analysis all the available project materials were collected. E-mails between partners were forwarded to the author by the teachers. The content of Reppu web site has been available since the author was joined in the group in March in 2014. The author has also access to Coospace web site in Budapest Business School where the materials produced by trainers are.

Because the author was not able to participate on the training sessions and this project was started before the authors' studies, it is possible that all materials were not available in this research. However, there was enough material for content analysis and for the evaluation of the course structure.

The content analysis was done to observe the unity of the materials and how the course followed the original action plan. The materials had been read through several times to find out what themes were the most visible. In this way, it was possible to find out what were the most critical factors in this project. The content analysis will identify a meaningful information from the documents in written form and it is different than the content quantification where the meanings or words are calculated (Tuomi & Sarajärvi 2013, 106). In this research the content analysis is used because the materials are collected from different sources and therefore they are not coherent.

The questionnaire to ADAPTYKES participants

The planning of the questionnaire started when the literature review was done and the themes were chosen. The questionnaire identifies trainers' strategic approaches to learning and studying. It uses a Likert technique for measuring attitudes and is asking their agreement on a five-point scale with a series of related items.

There are three different kind of approaches to studying that can be used in research - deep, surface and strategic. A strategic approach usually identifies the study structure, time management and the achievements with the motivational aspects. (Entwistle, McCune & Tait 2013, 3-4) In this questionnaire questions were related to the learning content, cooperation and communication between Lahti University of Applied Sciences and other partners in ADAPTYKES project. Questions were divided in three main groups: general questions, specified questions and open questions.

Five general questions were compulsory and they were concerning the information of participants' background. The participants were asked their gender, age, nationality, education background and how many partner meetings they participated.

42 specified and five open questions were optional. Scale for specified questions (1- 42) was: 1= strongly disagree 2= disagree 3= no opinion 4= agree 5= strongly agree. It was reminded to the respondents that an option in the middle (3) is marked as no opinion, in case, they do not have an opinion or they do not understand the question. Open questions were there to give the participants a possibility to give free feedback. Open questions were:

1. From who or where you got most support during assignments?
2. What were the most important barriers to your learning in this course?
3. Please list some things that Finnish teachers did in order to promote your learning.
4. How would you describe virtual environment of Reppu at LAMK web site?

5. Evaluate how significant was the role of quality people?

The questionnaire was made at Google Drive application and link to the questionnaire was sent by e-mail to all trainers who participated in the trainings which were operated by Lahti University of Applied Sciences. In e-mail there was the cover letter where the information about this research was given. They were told that the goal of this master's thesis is to study how well communication and cooperation between the participants have been operated and what their own experiences during this project were. The participants were informed that in the research all personal information from the questionnaire will be kept confidential.

The partners from Hungary and Romania sent the author e-mail addresses for all participants. There were totally 29 participants, 14 from Hungary and 15 from Romania. The questionnaire was open for five weeks until the 6th of January 2015. The responses to the questionnaire were automatically collected in Google Drive. There were also the real-time response info and the charts available. The data of specified questions was shown as a bar chart and the data of general questions was in a pie chart. Data was later transferred from Google Drive into the excel sheet and all answers were handled anonymously.

The questions were first classified in groups with a total agreement or disagreement on issues. If there was the total agreement, then options 4 (agree) and 5 (strongly agree) were chosen for 50 % or more. If there was the total disagreement, then options 1 (strongly disagree) and 2 (disagree) were chosen for 50 % or more. Also the questions with a large distribution were collected together. This means that all options were chosen in results. If option 3 (no opinion) had been chosen 50 % or more, these results were collected. This kind of evaluation gives information about what parts of the project are seen to be successfully organized and what issues are causing variation.

After the first classification the questions were classified in three categories: motivation, the course content and communication. The questions that were related to motivation included the questions about time management, self-oriented learning, technical skills and the importance of this course to their own

occupational career. The course content included the questions about the teaching materials and how motivating and interesting the assignments were to the trainers.

The questions which are concerning guidance, feedback, contacts and co-operation are called as communication. Here the results are shown as how the members of each country agreed on the questions asked. The answers with the opinions agree (4) and strongly agree (5) are calculated together and will be shown by percent.

Because there was only a small group of respondents the wider statistical analysis could not been done.

The inquiry to teachers and quality management

The inquiry was sent by e-mail to two Finnish teachers and two quality persons. These people were aware that the questionnaire to the trainers will be done. In the cover letter there was information that the questionnaire to the trainers has been sent and the results of this will be ready in January and there will be a short presentation of the results during the next partner meeting.

The questions were asked to make sure that all the participants were involved in the research. Their experience in this project is an important part of this research. They had five weeks to answer and the latest return date was on the 6th of January in 2015. Both Finnish teachers answered individually to the questions. Quality management gave their shared answers.

The questions to the teachers and to the quality management were concerning co-operation, the course content, learning goals and internationality. There were some questions where they self-evaluated their own competence and work during this project.

Observation and discussions

The observation was done during two partner meetings. The first meeting was in Lahti between 25th and 26th of September in 2014. The partners who were involved in the meeting were told before that the observation will be done during this time. The second observation was done in Budapest between 22nd and 23rd

of January in 2015. This time, the participants were not told in advance that also observation will be done. They were, however, aware that the author will be joining the meeting. In these situations the communication between the partners was highly stressed because these were only situations for the author to meet the participants. Information gathered in the observation situations were written at the same time when things occurred. This includes the author's own notices on the situations. The discussions with the quality management during both partner meetings are the part of the observation.

4 RESEARCH FINDINGS

Results from the questionnaire are first classified for three different groups: answers with no opinion, answers with mutual agreement and answers with large distribution.

After that, the results are classified based on the themes from the theoretical framework: motivation, the course content and communication. The findings from the inquiry, content analysis and observation are added under these themes. The results of the questionnaire are shown as percentage.

4.1 Research environment of questionnaire

11 of 29 participants took part in this questionnaire and answered the questions but one respondent's answers are not taken into account while there were over half of the questions left empty. The response rate was then 34 %.

As it is seen, most of the respondents have the highest level of education (70%) and they were very actively participating the meetings. Most of the respondents were female (70 %) and there were the participants from all age groups except 25 years or younger.

TABLE 3. Research environment of questionnaire

		Total (n=10)
GENDER	Female Male	7 3
AGE	<25 26-35 36-45 >46	0 4 4 2
COUNTRY	Hungary Romania	6 4
EDUCATION	Bachelor's degree Master's degree Doctorate Other	0 2 7 1
PARTICIPATION OF MEETING	0 1 2-3 4 or more	0 1 4 5

4.2 Questionnaire results

Responses with no opinion

There were totally five questions where choice no opinion (3) was chosen for 50% or more. No opinion alternative was there because the group of the respondents were not chosen volunteer and then it is not fair to force them to answer. When choosing answer no opinion (3) it shows that the respondents have no interest on this issue, the respondents do not understand the question or do not want to tell their own opinion.

TABLE 4. Responses with No opinion (%)

	1	2	3	4	5
	DISAGREE>				<AGREE
This training course is important for my occupational career.		10	50	20	20
I am satisfied with amount of training assignments.		10	50	10	30
I would like to have more possibilities to conversation with group members.	10		60	30	
Course assignments were challenging and motivating.			60	30	10
The number of assignments versus course timetable was suitable.			50	50	

Most of the respondents (60 %) did not want to express, do they feel that the training assignments were motivating or if they wanted to have more possibilities to conversation with other group members. On the other hand, the rest of the respondents agreed these questions. Also 50 % of the respondents did not want to say if this kind of training is important for their future occupational career.

When the questions concerned the course content there were also more answers with no opinion. Most of the respondents still were satisfied to the course content and the assignments.

Responses with mutual agreement

There were four questions where all of the respondents agreed. The greatest common agreement was when their own working skills were asked. 80 % of the

respondents self-evaluated that they had been working actively during the training course. The rest of them considered themselves to be even more active.

TABLE 5. Responses with Mutual Agreement (%)

	1	2	3	4	5
	DISAGREE>				<AGREE
I am satisfied how training course was organized.				60	40
I was working very actively during this training course.				80	20
Our cooperation inside group developed during this course.				60	40
Lamk teachers responded to my concerns.				40	60

60 % of them were also satisfied how the course was organized. They also felt that the co-operation inside the group developed during this training. What comes to the guidance from teachers, all of the respondents were satisfied.

Responses with mutual disagreement

There was the total disagreement towards one question. All of the participants thought that they did not have technical problems with connections.

Responses with large distribution

Four answers were clearly different from other answers. In these questions all categories were chosen (1, 2, 3, 4 and 5). There are two questions that are related to the early days of training. First question was asking how familiar these issues were to the participants. One fifth of the respondents did not have an opinion on if they knew what this training included. For the rest of them it was familiar (30 % strongly agree) or not familiar at all (30 % disagree).

Co-operation with the members from other country was asked next. Totally 30 % agreed that they had regular contacts and the same amount of people did not have these.

TABLE 6. Responses with Large Distribution (%)

	1	2	3	4	5
	DISAGREE>				<AGREE
After first start-up meeting I understood totally what this training included.	10	30	20	10	30
I had regular personal contacts with members from other country.	10	30	30	10	20
All information I needed to complete assignments I got from LAMK teachers.	10	10	30	20	30
There should have been more guidance from Finnish teachers in the beginning.	30	10	30	20	10

The question related to the guidance has large distribution. The respondents were asked if they got all needed information from the Finnish teachers. Again 30 % of the respondents did not see this question relevant to answer. More respondents were thinking that they got needed information from the Finnish teachers.

One question was related to the Finnish teachers' guidance in the beginning. There 30 % did not feel they needed more guidance and on the other hand 10 % strongly agree for it. In this question there is also 30 % of answers with no opinion.

4.3 Motivation

Many things can have effect on learning motivation. In this part some of these factors are under evaluation. The respondents were asked how they evaluate their own technical skills and time management. As it was earlier shown the respondents had evaluated their own activity very high. Most of them also evaluated that their technical skills are excellent (50%).

Most of the respondents are satisfied with their studies and they think they have learnt skills what they wanted to learn. Earlier experiences have effect on how the new knowledge is understood. In this case most of the respondents (60 %) evaluated that the study content was already familiar to them.

TABLE 7. Motivation and own skills (%)

	1	2	3	4	5
	DISAGREE>				<AGREE
My technical skills with computers are excellent.		20	10	50	20
I have achieved the skills I was looking for during this course.			30	50	20
I am satisfied with my studies at this training course.			10	50	40
Issues in training course were familiar to me.		10	30	30	30
I felt lack of studying skills during this course.	20	60	10	10	

60 % of them agreed that they had problems with time management. Motivation to learn kept on a high level because most of the respondents disagree that they felt the lack of motivation or the lack of studying skills during training. Language problems were not delaying learning. During the observation situations it was seen that people who were not so familiar with the language that was used in the meetings, were not following the discussions as carefully as others.

TABLE 8. Motivation and time management (%)

	1	2	3	4	5
	DISAGREE>				<AGREE
I had problems to arrange time for learning.	10	10	20	60	
I had often technical problems with connections.	60	30	10		
Language problems delayed my studies.	60	20	10		10
I felt lack of motivation at some time during this course.	30	40		20	

Only 20 % of the respondents report that they had some motivation problems. The most important barriers in learning were mentioned to be the lack of time or the course structure.

4.4 Course content

Course content was designed on the basis of the masters' studies carried out earlier at LAMK by the Finnish teachers. The quality management saw this as an

enormous advantage which increased the confidence level of the receiving team. The Hungarian and Romanian participants did not participate into the content planning as was the original idea. The big picture of the training course was created by the Finnish teachers. They were also responsible for the detailed study visit plans in the trainers' training courses.

Reppu web site was a module based learning environment where the Finnish teachers had collected documents and links to the other web sites. Written materials were mostly Finnish teacher's own and they were edited to be used in this training course. Reppu web site included documents, links to a book and other web sites, discussion areas and feedback areas. As extra material there were some instructions for learning and how to plan the studies. The learning materials were all written documents, mostly saved as word or pdf format.

TABLE 9. Course content and materials (%)

	1	2	3	4	5
	DISAGREE>				<AGREE
I feel that I had enough time for course assignments.		10	30	50	10
Virtual environment of training course on LAMK Reppu was clear.		10		50	40
I expected there is audiovisual material on Reppu.	10		40	40	10
Learning material from LAMK Reppu was easy to understand.			10	60	30
Course assignments promote to collaboration.		10	30	30	30

There were no audio visual materials on Reppu web site. 50 % of the respondents expected that there will be audio visual materials, but at the same time, almost the same amount of people did not have opinion on that.

For the course structure in Reppu web site most of the respondents agreed that the virtual environment was clear. But when they were asked how they would describe this virtual environment of Reppu, they answered as followed:

"Lot of information, a bit chaotically organized"

"Simple (easy to use), transparent, well structured"

"Clear, well designed, easy to understand with interesting and

useful content"

"Not too well structure for my understanding"

There were also areas for discussions and feedback in Reppu web site but these have not been used. These sites were planned to be used in the later stage of the studies, when the work with the business starts, but this was not functioning in a way it was planned due to delays in co-operation with the companies. There was a mention in documents that discussion areas were available to every trainer, but there were any information about how those should be used, or if the discussions will be followed either the summary will be done. Most of the respondents did not visit in Reppu web site very often and 30 % of people had no comment for this question. The respondents' opinions about the course content and instructions are shown below.

TABLE 10. Course content and instructions (%)

	1	2	3	4	5
	DISAGREE>				<AGREE
There has been enough face-to-face meetings during training.			40	40	20
Course assignments were clear to me.			20	50	30
I visited on Reppu training site regularly.	40	20	30		10
I needed to search information from other sources to complete tasks.	10	50	20		20

Before every face-to-face meetings there were timetables and the content plans for training days. Feedback from face-to-face training was asked after one training and it was good. The respondents said that there was quite much theory and new information to learn. Despite the great amount of new information they were very excited to learn. Face-to-face trainings were the important part of this project. The methods that were taught to the trainers required a lot of team work and co-operation. The Finnish teachers' presence and their experience on these matters helped the trainers to understand the learning content. Their interesting stories and examples from the Finnish companies were seen as an inspiring factor and the Finnish teachers' work promote trainers to learn more.

To ensure enough time for understanding and meaning making the longer face-to-face trainings were considered to be better by the Finnish teachers. For the respondents' opinion there has been enough face-to-face meetings during this project. All in all face-to-face meetings were well organized while both the respondents and the Finnish teachers evaluated them as one of the most successful part of this project.

The materials in this training course were mostly understandable, only a few person agreed that they needed to search information from the other sources. Evaluation on the course content by the Finnish teachers stressed out that the virtual environment was not used as it was planned. Feedback for the course content and the course design was mentioned to be useful, when evaluating the whole teaching process by the Finnish teachers.

The personal resources in the course planning were overloaded. The course content was planned and organized mainly by the leader teacher. High competence on the content matters was seen on the course structure. All of the possibilities that could have been used in the virtual environment were not used. More time for the planning and more personal resources were the critical factors and the hopes that were identified among the Finnish teachers' answers. Some visitors from the Finnish business world were used on face-to-face trainings but they were there only for to increase the business perspective. In pedagogical or the content planning they were not involved in this training course.

The local differences appeared in co-operation and in the learning processes. There was the different understanding of pedagogical approaches which were not understood before the project started. The co-operation culture between the higher education institutes and the companies is more limited in the partner countries than in Finland. These issues were delaying the learning processes. To ensure the local adaptation, the sociology studies have been done. According to the inquiry these could have been shortened to save more time and resources to the actual learning processes. Information given by the sociology studies was very useful, but time they required was not taken into account in the course planning.

The goals of project were reached rather well according to the Finnish teachers. There were some difficulties which will be analysed. The time management of the project and the personal resources has been considered as critical factors. The transfer of knowledge and the adaptations of the contents, on the other hand, had worked remarkably well according to the quality management.

4.5 Communication and cooperation

Pedagogical support and tutoring was done using online tutoring. The Finnish teachers were answering the questions whenever the trainers had problems or they needed guidance.

Feedback about tutoring was mainly good. Some trainers were very satisfied how they get help for their learning problems or how to handle the Reppu web site. The roles of the Finnish teachers were evaluated slightly more as content experts than motivators. Most of the respondents evaluate that some team members worked more than others. Team members' work promoted to collaboration slightly.

TABLE 11. Communication and cooperation

AGREE	HUNGARY (%)	ROMANIA (%)
The roles of LAMK teachers were more content expert than motivator.	50	50
Discussions during the face-to-face meetings helped me to do assignments.	83	50
I got enough support and guidance for content matters.	83	100
Feedback from Finnish teachers helped me to refine my thinking.	83	100
Groups from different countries worked well together.	66	75
Some members of the group worked more active than others.	83	75
Collaboration between groups was successful.	100	75
Mutual guidance and assistance among the students promoted collaboration.	66	50

Discussions and feedback from the Finnish teachers have helped them to refine their thinking. The Hungarian respondents evaluated face-to-face trainings slightly

more helpful than the Romanian respondents. Tutoring and feedback from the Finnish teachers was highly appreciated among the Romanian respondents.

The Finnish teachers themselves evaluated that they could have been more active on communication. They were mostly contacting the participants through e-mails and asking how the work was proceeding. The idea of the communication plan and the evaluation plan, can be seen as a sign that the importance of communication had been understood among the Finnish teachers.

Co-operation between groups has worked quite well and there was guidance between students. Everyone from Hungary evaluated that co-operation between groups was successful. From Romania 75 % of the respondents agreed on this issue. During the partner meetings there were no signs of fluent co-operation. As Hungarian team was responsible for the project management their role as the leading team was visible. During the first meeting where the observation was done, they were mostly planning and discussing themselves and the Romanian partners were only listening. Their opinion was asked in the end if they agree or not what the Hungarian partners have decided.

The quality management was observing the transfer of know-how between the countries. They were identifying some delays and the periods where the exchange of information between the partners was too low. Especially during the first months they recommended a more active communication between the partners. Their proposal to the partners was to publish a monthly activity report to ensure that the participants have a better understanding of ongoing development.

TABLE 12. Communication and project management

AGREE	HUNGARY (%)	ROMANIA (%)
The role of the quality people was important.	50	100
Feedback from quality people promote my learning.	83	100
Factors that delayed project could have been avoided by better planning.	33	75

The role of the quality management was highly appreciated among the Romanian respondents. When all of the respondents were asked to evaluate how significant the role of the quality people was they answered:

> *"Don't really understand the question"*
>
> *"They helped not only the project management, but also the content adaptation and development in Hungary and Romania"*
>
> *"They assured that all project activity be done."*

The biggest difference was seen when the reasons for the delays were assessed. More than half of the Romanian respondents agreed that the better planning could have solve these problems. From the Hungarian respondents only one third of them agreed on this question. The inquiry among the Finnish teachers shows that the reason of the delays at the beginning of the course was derived from the limited co-operation in the course planning. This was seen as the lack of mutual understanding and indefinite objectives.

The translations and the sociology studies took more time than was expected but the careful attention to the differences between the countries was also highlighting some important factors which needed to take into consideration. This would not happened if this work have not been done.

5 CONCLUSIONS

In this chapter, conclusions are made based on the most important findings and the results of the case study. Here are the answers for the research questions and the e-learning model is developed based on the research results and information from the literature review. The validity and the reliability of this research are assessed in the end.

5.1 Research conclusions

The first research question was: *How did trainees manage with self-oriented ADAPTYKES studies and what kind of support was available from ADAPTYKES-project's quality people?*

The answer for this first question is mainly delivered from the results of the questionnaire. According to the participants there were no major problems during their studies. Time management was analysed to be one of the main factors effecting on learning in the literature review and similar results are visible here. Though it must be reminded that time management is always linked to the tasks and how people are organizing their studies. If the learning content and the materials are so tempting that person does not want to let go of studying, then time is not the limiting factor. If learning is something that person just need to do in order to achieve something else, then the required work is usually postponed and will be done at the last minute.

According to the results from the questionnaire it looks like time management concerning the given tasks was successful because there was not much disagreement on these issues. Most of the participants were satisfied on the materials in the course content. They were also satisfied on how this training course was organized.

Language problems were delaying studies but this was expected while all of the materials were written in the language that was not the native language to the participants, including the Finnish teachers. The respondents evaluated their activity to be very high and they did not have technical problems. People usually have a tendency to evaluate their own competence higher than it actually is.

Most of the respondents did not want to say in the questionnaire if this project was promoting their occupational career. Self-evaluation in such matters may be more relevant when the training project is over and the actual work will continue.

When the results are checked more critically there are clear problems to identify. When this project started most of the participants did not completely understood what the training course included. Also there was a need for the extra materials and guidance. Some of the participants agreed that they needed to find information from other sources. It was emphasized at the first study visit that one of the success factors will be communication and the smooth information flows between the project partners but, however, at the beginning of the project there were not enough signs of such actions. In the end most of the respondents were satisfied with their studies. Though there were the cultural differences and the learning technics are not similar in each country, most of the participants still did not feel the lack of studying skills.

The quality management had to ask the feedback of the partners' activities and in the early days of the project they needed to remind the participants to strengthen the communication. The Finnish teachers were also evaluating that they could have been more active on communication. It is good that the importance of guidance is understood and the improvements to communication will be done.

The role of the quality management was notable. Their interventions were helpful to the participants in order to gain the objectives agreed in the partner meetings. Their work was also highly recognized among the participants.

The second research question was: *How should international collaborative e-learning courses be improved in the future with the given knowledge from ADAPTYKES -pilot project?*

In the future there should be more resources in the course planning. As it was highlighted in the literature review only the careful planning of the course will provide the good learning results. When co-operation starts all of the partners ought to be involved in the course planning. In this way the cultural differences can be recognized and the learning methods can be chosen in such a way that they are suitable for each partners.

The course content should be so flexible that it allows to make the changes if there are problems which need more time to solve. The better time management can be achieved if the learning content is divided into the smaller pieces and there will be more tutoring and guidance available.

Before the planning of the e-learning course, each partners' technical skills and the possibility to use the virtual environment must be examined. The partners' willingness to use e-learning is depending on their earlier experiences. The discussion areas and the learning materials ought to be organized in a way that they will support learning and promote the partners to collaborative learning.

It is difficult to measure if communication between the partners will promote learning or not. The partners' satisfaction in co-operation between each other's does not tell if it has the relevant meaning on the learning results. Communication in the learning situations means exchange of ideas and experiences. For this kind of meaning making there ought to be enough face-to-face meetings or virtual discussions. Also the course content should support this kind of learning so that the results of the mutual decisions are visible and can be used when the course proceed.

Evaluation can be planned so that it is the part of learning during the whole course. The self-evaluation of the partners done in the virtual environment will help the participants to evaluate their own achievements and it is useful for the course planners to understand what kind of guidance the participants need. The course content and the learning outcomes evaluation are important in the context of the reform of the courses.

The main research question was: *How should international e-learning projects be planned concerning co-operation between academic trainers and SMEs?* Answer for this question is in the next chapter where the findings of the research and information from the literature review are joined together and the e-learning model is created.

5.2 E-learning model

As it was mentioned in the introduction of this thesis the academic schools are recommended to produce and market their social innovations and services. The experiences and the results from this project and information collected for the e-learning model is recommended to use when new courses will be planned.

Variables impacting on the quality of e-learning showed earlier can be used when the target groups and the learning goals are assessed. Three major factors in TPACK-model will help to recognize the different sectors of knowledge. Table 13 below is showing what factors are important in the course planning.

TABLE 13. E-learning planning

FACTORS OF TEACHING	PEDAGOGICAL PLANNING	VIRTUAL COURSE PLANNING	TEACHERS' NEW COMPETENCE AREAS
INDIVIDUALITY	Technical and learning skills Goal and reason to learn	Target group Learning goal	Understanding of presence and learners' special needs.
SOCIAL COMMUNITY	Social activity Learning styles Culture & Language	Wide of studies The scope of content	Awareness of surrounding reality.
TEACHING METHODS	Transformational, Constructive and Collaborative learning.	Learning methods Materials Media focus	Change management. Understanding of learners' earlier experience. New media adaption.
LEARNING ENVIRONMENT	Hierarchical or module type content base model. Problem based learning.	Technical systems Support and Instructions Benchmark	Virtual network knowledge. Awareness of change.
GUIDANCE	Individual & group guidance Virtual discussions Communication plan	Tutoring Mentors	Role of pedagogue. Importance of guidance.
EVALUATION	Self-evaluation Content evaluation	Time management Quality	Controlled time planning.

The major factors of teaching are placed on the left and next there are issues that must be considered in the pedagogical and the virtual course planning. Teachers' new competence areas are included as they were described earlier based on the previous researches in the universities.

The e-learning model is explained next and the figure of this model is seen in Appendix 3. All basic information that is presented in the literature review and the research findings are collected together. In the future the course planning of e-learning ought to contain all three important parts: the course content, pedagogical planning and technical planning. To design the training course which is easy to reform, the course structure can be assessed by thinking which elements are quite stable and which has a large variability.

1st Stage - Planning

Especially pedagogical and technological planning is good to be done by at least two people or a team from each participating groups. All aspects that are influencing on e-learning are then recognized. The planning of the course content depends on the subjects that will be taught and will have an effect on the pedagogical methods and the technical solutions.

Financial and personal resources are always different but for the personal resources there can be a minimum need planned based on the wide of the studies and the learning content. If the training course is organized in cooperation with other academic schools or institutions then also the course planning should be done together with the participants. When the roles of the participants are categorized these ought to be seen also in the communication plan.

The background research to find out social and cultural differences ought to be done before the course will start. Then it will not take time from the actual learning process and the specialities for each partners will be understood. With this information the course can be planned in co-operation between all partners to fulfil their individual needs. One solution can be that the course content is divided into several modules and the partners will choose which modules they participate.

The evaluation of communication includes all participants and is recommended to done after the course planning. This will strengthen co-operation and the possible lack of information flow is observed and the changes can be done before the actual learning process will start.

2nd Stage – Virtual learning

The learning goal, the wide of studies, learning methods and teaching methods are depending on each other. If the learning content will not stay the same then variability is large. Otherwise, if only the target group changes and there are no large differences between the target groups then there will be only minor variations from updates and reforms.

Time used in the course planning is depending on the available personal resources. Though the learning content stays similar for each group, it does not mean that time management stays the same. Time used for learning and teaching is depending on the different needs of the target groups. The duration of the course is based on the course structure. The problem based learning course need to be more flexible than the content or the module based learning course.

The mentors from the business world can have a useful perspective in virtual learning. Their expertise will add value on how the training can be done in a way that the best practices used in the business life will support the actual learning process. With the international relationships the business tutoring could help when new ideas are adapted to other countries. The best practices learnt here in the local work places can work as an inspiration for the foreign schools and businesses. Tutoring must be planned as a long-term action so that the earlier experiences are guiding and supporting the learning process. This may also courage the foreign businesses to take part in the training course when they know that there are the possibilities to create the new business relationships.

3rd Stage – Learning Process

The target group is the most changing element because there are new learners every time. The differences between the target groups has effect on the learning content.

Evaluation and quality has not remarkable variation if the evaluation plan is done in a way that it supports learning and is linked into the course content. For the future projects the author suggest to use the self-evaluation for both the learners and the teachers during the course. When the materials will be placed on the

virtual environment, the evaluation is easy to create with them and the results will stay there as a guideline for the learners and the teachers. The course content evaluation shall be divided into smaller pieces, concerning e.g. materials, teaching methods, technical solutions and the scope of studies. Evaluation is recommended to be done separately to the target group, the responsible teaching group, the monitoring group and other participants.

4th Stage - Results

In the last stage all learning results shall be evaluated. In this evaluation the most useful way is to assess if the objectives planned in the first stage are reached. The results of evaluation will be transferred into the reforms. In this stage, all the updates to the learning materials and to the media elements which have been used will be made.

Classification according to the variability is only one way to assess the course content. There are also other ways and people who are working in the training course planning, shall choose the classification that is the most appropriate for them. Some kind of assessment and classification is however needed if the commercial use of the training courses is planned.

This created e-learning model is designed to be used in the course planning in the future. With this model it is easy to see the major factors in e-learning and their relationships. Here is also seen how important role communication has in virtual learning. This model is also the answer to the main research question. In the future, the international e-learning projects can be planned according to this model. Co-operation between the academic trainers and SMEs ought to be strengthened with the efficient course planning and by adding more business perspective in teaching and mentoring.

5.3 Validity and reliability of study

The validity of the research can be measured as an internal and an external validity. The research is internally valid if the results are explained as the result of that research in question. Assessment is based on the theoretical framework and its concepts. The actual research process is executed as it is described and it will

answer to the research questions. External validity is measuring how the results can be universalized. The research is more beneficial if the results can be applied in wider use. (Trochim 2006)

Internal validity of the research is good. The theoretical framework has been used to create themes that were given basis to the questions asked from the trainers. The literature review was showing the most common advantages and disadvantages in virtual learning. This was working as a guideline when the experiences of participants were asked. The methods that have been used are suitable to assess their expectations and experiences. Also external validity is good. This thesis gives an overview of the whole project to the teachers and other people involved in this project. The research results are showing the issues that were operated very well and the issues that need more careful planning in the future.

The validity of the research defines if the research methods have been appropriate in order to answer the research questions. (Hirsjärvi, Remes & Sajavaara 2012, 231) In this research more specific results could have been achieved if the interviews had been done. There were no interviews because the participants live in other countries and it was not possible to arrange enough time for that. Also the author was aware that the participants worked under pressure during this project so it was not sensible to overload their work.

The reliability of the research refers to the accuracy of the results and the repeatability of the research. (Hirsjärvi, Remes & Sajavaara 2012, 231) This research is repeatable but the results may vary on several reasons. This was the pilot project and on the next project the results may be different depending on the participants, the project structure and the time and the situation where the project takes place. While most of the participants did not answer to the questionnaire it has effect on the accuracy of the results. More detailed answers to the open questions would have given the better understanding of the participants' experiences in this project.

The questions that are measuring the views are undermining the research reliability. The respondents are not necessarily willing to evaluate his/hers

feelings objectively or their opinion is depending on their state of mind. They might also give the socially approved answers or try to answer in a way which gives the better results than the reality is. Other factors that has effect on reliability are the respondents' difficulties to remember afterwards or language problems. (Taanila 2014, 27) In this research the questions were written in a language which was not the native language of the respondents and it is uncertain whether the respondents understood the questions correctly.

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APPENDICES

APPENDIX 1

QUESTIONNAIRE FOR TRAINEES

This questionnaire includes 5 general questions, 42 specified questions and 5 open questions. Questions are related with learning content, cooperation and communication between Lahti University of Applied Sciences and other partners in ADAPTYKES project.

Scale is: 1= strongly disagree 2= disagree 3= no opinion 4= agree 5= strongly agree

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01. Gender *
Female Male

02. Age *
< 25 26 – 35 36 – 45 > 46

03. Country *
Hungary Romania

04. Education background *
Bachelor's degree Master's degree Doctorate Other

05. How many partner meetings you participated *
0 1 2-3 4 or more

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1. My technical skills with computers are excellent.
2. Issues in training course were familiar to me.
3. This training course is important for my occupational career.
4. I am satisfied how training course was organized.
5. I was working very actively during this training course.
6. I had problems to arrange time for learning.
7. I felt lack of studying skills during this course.
8. I have achieved the skills I was looking for during this course.
9. I had often technical problems with connections.
10. I felt lack of motivation at some time during this course.
11. I am satisfied with my studies at this training course.
12. Language problems delayed my studies.
13. After first start-up meeting I understood totally what this training included.
14. I am satisfied with amount of training assignments.
15. I feel that I had enough time for course assignments.
16. There has been enough face-to-face meetings during training.
17. Course assignments were clear to me.
18. Virtual environment of training course on LAMK Reppu was clear.

19. I expected there is audiovisual material on LAMK Reppu.
20. Learning material from LAMK Reppu was easy to understand.
21. I visited on Reppu training site regularly.
22. I would like to have more possibilities to conversation with group members.
23. I needed to search information from other sources to complete tasks.
24. Course assignments were challenging and motivating.
25. Course assignments promote to collaboration.
26. The number of assignments versus course timetable was suitable.
27. Groups from different countries worked well together.
28. I had regular personal contacts with members from other country.
29. The roles of LAMK teachers were more content expert than motivator.
30. Our cooperation inside group developed during this course.
31. Some members of the group worked more active than others.
32. All information I needed to complete assignments I got from LAMK teachers.
33. Collaboration between groups was successful.
34. Mutual guidance and assistance among the students promoted collaboration.
35. Discussions during the face-to-face meetings helped me to do assignments.
36. I got enough support and guidance for content matters.
37. Feedback from LAMK teachers helped me to refine my thinking.
38. LAMK teachers responded to my concerns.
39. The role of the quality people was important.
40. Feedback from quality people promote my learning.
41. There should have been more guidance from LAMK teachers in the beginning.
42. Factors that delayed project could have been avoided by better planning.

Open questions:

100. From who or where you got most support during assignments?

200. What were the most important barriers to your learning in this course?

300. Please list some things that LAMK teachers did in order to promote your learning.

400. How would you describe virtual environment of Reppu at LAMK web site?

500. Evaluate how significant was the role of quality people?

APPENDIX 2

QUESTIONS FOR QUALITY & TEACHERS

These 10 open questions are addressed to quality people and teachers.

Questions are related to project work, cooperation and communication between partners in ADAPTYKES project.

Please answer the question with open mind and at the same time evaluating your own participation during project.

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1. What was the most important issue / experience for you in this project?
2. What subjects were most successfully operated during this project?
3. There were some timetable delays during project. On your own opinion what were main reasons for that and how delays could have been avoided?
4. How do you evaluate your own competence and experience at e-learning environment?
5. How do you think your own work / approach influenced on teamwork between groups?
6. What are 2-3 most important things you would done differently if project starts now?
7. On your own opinion, how well were goals of project reached?
8. How multicultural participation and local differences appeared in cooperation?
9. What advantages / disadvantages you find when you evaluate course content and international cooperation together?
10. How actively you were in contact with all partners during project?

APPENDIX 3

MODEL OF E-LEARNING