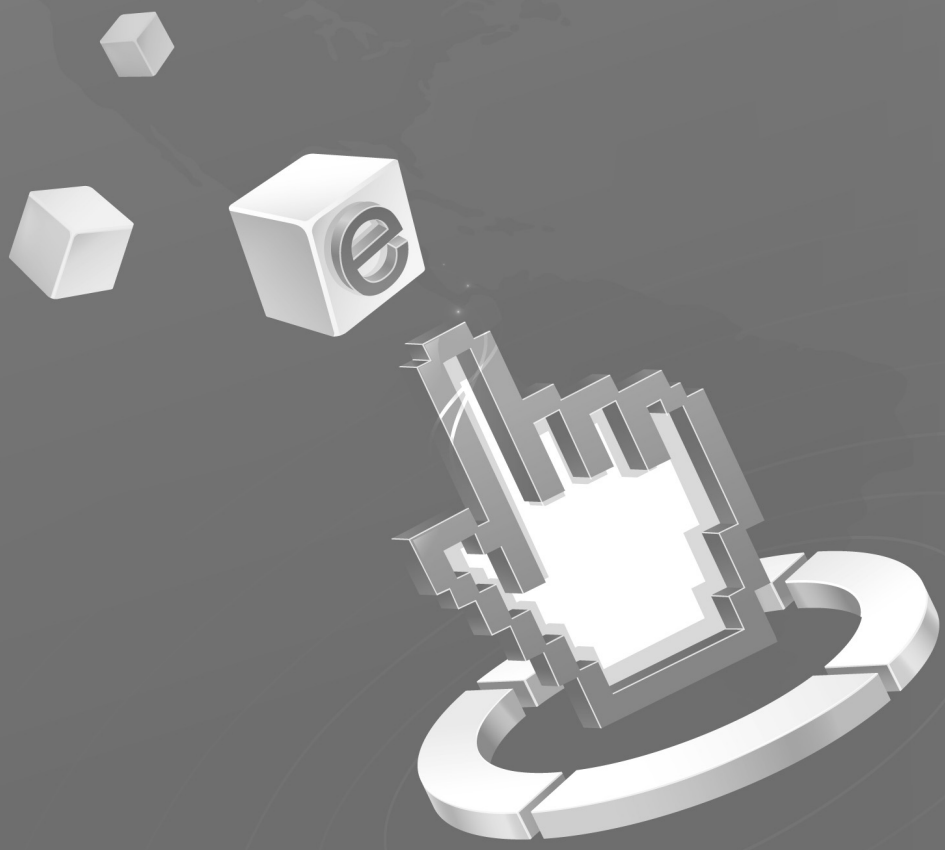
# e-Learning for Lifelong Learning in Ubiquitous Society

e-ASEM Collaborative Research Paper



Korea National Open University

# e-ASEM Collaborative Research Paper : e-Learning for Lifelong Learning in Ubiquitous Society

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# Foreword

The world has been moving toward to a ubiquitous society. Striving to keep pace with this social change, distance education has been developing new forms and structures of learning, and transforming its learning environments. The future of distance education will go beyond the concept and culture of today's e-Learning and move toward ubiquitous learning. U-learning will allow learners to get access to learning resources at their fingertips with their electronic learning devices.

In this sense, u-learning represents the next generation of distance learning and opens a new horizon of lifelong learning. Thus, I believe it is time to newly define the role of e-Learning in a ubiquitous society and to move the definition of u-learning beyond a simple comparison to e-Learning.

In this respect, the e-ASEM research network, with its leading researchers in the field of e-Learning and ICT, has put together a collaborative research paper: "e-Learning for lifelong learning in ubiquitous society." With a wider audience in mind, this collaborative research paper aims to share its best experiences with ubiquitous technologies in lifelong learning and u-learning trends existing in Europe and Asia.

This publication will serve as a useful and constructive foundation to understand the nature and the concept of ubiquity in lifelong learning as well as e-Learning initiatives of Asia and Europe for the ubiquitous era. Furthermore, I sincerely hope that this publication will serve as a stimulus to further explore various aspects of u-learning and thereby offer an important first step toward reaching a consensus on the definition of u-learning based on its own merits.

I would like to express my deepest gratitude to the contributing authors. Without whom this publication would not have been possible. I would also like to express my gratitude to Mr. Claus Holm, the chairman of the ASEM Education and Research Hub for Lifelong Learning, and Dr. Taerim Lee, the coordinator of the e-ASEM Research Network 1. Now, I am delighted to share the e-ASEM's professional knowledge, experiences and practices of e-Learning in a ubiquitous society through this publication: "e-Learning for lifelong learning in ubiquitous society."

**Nam Chul Cho, Ph.D.**
President, Korea National Open University

# Preface

This publication is an e-ASEM collaborative research paper jointly written by six key member countries of e-ASEM: Korea, Malaysia, Latvia, Thailand, Denmark and Slovakia. This book presents how the current ubiquitous technologies are applied to e-Learning in lifelong learning in six different countries. I am delighted to see the third outcome of e-ASEM's cooperative work.

The e-ASEM network is research network 1, which is under the ASEM Education and Research Hub for Lifelong Learning. The e-ASEM is actively involved in conducting collaborative research projects and holding international conferences with regard to the latest topics in the academic realm of distance education, such as ICT skills, theories and practices of e-Learning, and e-Learning policies in lifelong learning. Since its inception in 2005, e-ASEM has been dedicated to lead Asia and Europe in becoming a society of lifelong learning and to achieve universal higher education. I am proud of e-ASEM's passion, professionalism and its outstanding researchers.

This book is destined to play a major role in providing and sharing the most up-to-date information on ubiquitous-learning. After reading this book, the reader can learn about various academic and practical approaches to understand the concept of ubiquity and to discuss the future of e-Learning in a ubiquitous society. Although the emphasis of this book is on professionals in the field of e-Learning, it contains much that will be of interest to the general public. I am confident that readers who will gain a broader perspective of the nature of ubiquity in e-Learning for lifelong learning through this book.

I would like to congratulate the contributing authors on the completion of this book and I would also like to express my heart-felt thanks to all those involved in its publication. I give this book my warmest recommendations.

**Claus Holm**

Chairman, ASEM Education and Research Hub for Lifelong Learning

# Acknowledgement

This publication is an e-ASEM collaborative research paper for ubiquitous learning, the next generation of distance learning. The world is moving toward a ubiquitous society and thereby changing the current e-Learning landscape. In this regard, this publication aims to provide valuable insights into the changing role and definition of e-Learning in a ubiquitous society. I am pleased to introduce "e-Learning for lifelong learning in ubiquitous society."

In this collaborative research paper, the theories and practices of e-Learning for lifelong learning in a ubiquitous society are presented by six ASEM countries: Korea, Malaysia, Latvia, Thailand, Denmark and Slovakia. The idea of publishing this collaborative research paper was proposed and the topic of the collaborative research "e-Learning for lifelong learning in ubiquitous society" was chosen at the network meeting held in Hanoi in December 2010. The representatives from the above six countries promised to participate and explore the complex issues of the topic. Since the meeting, the six participating countries conducted research under different sub-themes and perspectives. Progress of the research was presented at the network meeting held in Kuala Lumpur in November 2011. The basic structure of the book was discussed and agreed upon during the meeting, and then faithfully followed by the respective papers submitted by each country.

This publication will serve as a guide to understanding e-Learning in a ubiquitous society and as a useful start to more fruitful discussions over the topic. Furthermore, I hope this work will help academics reach a coherent consensus for the definition of u-learning as well as formulating u-learning policies and plans in all e-ASEM

member countries.

I have too many to thank for this publication. First, I would like to express my sincere gratitude to all the authors of the six countries. Without their dedication and passion, this collaborative research paper would not have been possible. Likewise, I would like to express my gratitude to the ASEM Education and Research Hub for Lifelong Learning and Korea National Open University for their continuing encouragement and financial support. Last but not least, my deepest gratitude goes out to the e-ASEM support team of the Institute of Distance Education.

**Taerim Lee, Ph.D.**
Coordinator, e-ASEM Research Network 1
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INTRODUCTION:

# The concept of ubiquity and technology in lifelong learning

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# Chapter 1 Ubiquitous technologies in learning

This publication presents a common research topic and interest of the contributors: *Ubiquitous technologies in learning*. Addressing this concept, different projects have been conducted in six different countries with the mutual interest of achieving new knowledge on its potential for learning as well as for educational projects as such. The participating countries are: Thailand, Malaysia, Latvia, South Korea, Denmark and Slovakia. The six countries have committed to investigate the nature of ubiquity either from the perspective of dissemination or from the perspective of the concept's presence in guiding teaching and learning processes.

On one hand, the concept of ubiquity indicates a developmental phase of e-learning, and on the other hand sketches an approach to learning that can potentially distribute activities beyond the physical limits of schools and universities. In that sense, ubiquity represents the possibility that learning can take place everywhere. This has to do with the relationship between the characteristics of the digital artifact, the content reached by the digital interface and the embodied experience from digital and physical spaces.

## 1.1 The role of digital artifacts for ubiquity

The evolution of digital technology has made it possible to access information from anywhere, which means that teaching and learning can take place almost everywhere. The nature of a digital artifact can range from the smallest mobile technology to technology-equipped intelligent rooms. The American researcher Renate Fruchter (2010) has for years worked with developing collaborative proc-

esses facilitated by technologies. Her aim is to enhance cross-disciplinary and trans-geographical teamwork through e-learning activities. She explores the relationship between the nature of a particular digital artifact and meaning-making among users. The most common form of digital artifacts is a desktop computer as this is usually the first experience most of us have with a digital working station. The desktop computer as an artifact could be regarded as the more advanced version of a typewriter, with the ability to store information as well as providing users with the capacity to type and re-type. From that position we regard the digital revolution in a linear historical perspective and view all new currents as innovations of the desktop computer.

However, Fruchter proposes a different perspective, which applies a fresh view on the characteristics of learning technologies. Here the size of a particular digital artifact becomes crucial. The size of a digital artifact influences how a user can interact with it, e.g.move it, sit by it or stand by it. She applies different sizes to the artifact: *extra-extra small (xxs), extra small (xs), small (s), medium, large (l), extra-large (xl)*. Her perspective gives the opportunity to understand ubiquitous technology from a potential-practices-for-learning point of view. Her 'size-mapping' of digital artifacts is as follows: smartphone (xxs), PDA (xs), tablet (s), desktop (m), smartboard (l), iRoom (xl). Fruchter's mapping tells us that as teachers, we not only have to focus on the digital mediation of teaching and learning, we also have to focus on how the idea of where ubiquity can take place, is formed by the nature of the technology of the artifact. Furthermore, we have to take into account how the technology of the artifact forms the situations for learning. For instance, if our learning tool is an xxs-sized smartphone, we can learn 'on the move', the body can take different positions, and wecan be close to the actual context from where the learning content is generated. Learning is not attached to a physical location like a university and may be replaced by the physical location where one is employed.

On the other hand, if our learning tool is an m-sized desktop you are forced to be in the particular physical space where the desktop is located, which is where

we have access to the learning resources. Laptops and tablets, which are very popular current devices, are uniquely sized, and this makes it possible to leave the desk to bring greater flexibility to the user. Thus, the characteristics of digital artifacts are a factor in teaching and learning processes and must be taken into account when we talk about ubiquity. Different digital artifacts will promote different teaching and learning behavior and instructions may be given very far from a lecture hall. Some projects in this book will show how the notion of ubiquity means being able to bring learning resources everywhere, thus erasing the limits of physical space.

## 1.2 The interface as the window to web-based learning

The internet is among various channels that provide access to learning resources. However, like the evolution of digital artifacts, the internet is undergoing changes from the current phase and state of being a giant database for information. The notion of web 2.0 indicates that digital capacity will not only change in the context of exchanging and adding digital information; the notion of web 2.0 indicates a change of communication practices as well. Sociality seems to be a new key notion for sharing, contributing and collaborating. Social practices emerge from the technological possibilities and affect learning. A huge amount of information and knowledge is generated on the internet. Instead of supportingan individual activity of achieving and storing new information as well as of learning by producing and storing text, the internet can promote the use of digital information as an open learning resource that can be used, revised, remade infinitely. Some projects in this book investigate how students respond to education initiatives that are meant to be accessed via internet and in that sense, can be considered to be ubiquitous (South Korea, Malaysia, Slovakia and Latvia). One project investigates local development of ubiquitous learning resources (Thailand). Another project discusses ‘telepresence’ as a ubiquitous premise for learning from an instructional and educational point of

view (Denmark).

## 1.3 The body as the interface for digital and physical spaces

The development of digital artifacts as well as the digital and communicativecapacity of the internet createsinterrelations where the body can be seen as a kind of interface for experience and thereby the third leg of the triad of the internet (Buhl, 2010). Mobile devices with extended access to internet activities frame the new field of experience that most educational systems in the world have yet to begin engaging with.

Addressing the notion of ubiquity is almost self-evident in lifelong learning, an area that aims to reach as many people as possible, to facilitate learning in all phases of life, under different circumstances and based on different geographical and temporal conditions.

Ubiquitous technology appears to be an unlimited possibility to support learning of all kinds and variations. Still, several key questions remain: What should be learned? What is the learning content? How do the new opportunities affect curricula? Does the fact that we are on the move when we use mobile technologies mean that the body can be 'a learner' too? For instance, spatial orientation could be a new potential if we choose to combine an actual physical context with instructions from a digital interface on a smartphone. Ubiquity could also include being able to integrate other modalities than text for learning purposes by also taking visuals and sound into account as learning modes.

# Chapter 2 Different countries, different research perspectives

The project reveals a multifaceted result from the subprojects of the participating countries. The subprojects are all grounded in and depend on the possibilities attached to the national initiatives in the field.

There are several factors that impact the conditions for conducting the subprojects. Firstly, we learned from the former project of the e-ASEM network, *e-learning in lifelong learning*, that the digital infrastructures in the participating countries are very different (Kim, et al. 2010). Secondly, we learned that the policy of education as such and of lifelong learning in particular take different forms in the participating countries, which also implies different ideas of pedagogy (ibid).

These two factors affect the circumstances of which the subprojects are generated. There is also a third factor that has an impact on how the subprojects are generated and contribute to reveal national diversity rather than national commonalities. The group has a common interest in investigating ubiquity with regards to technology and with regards to learning. However, the different paradigms of conducting educational research make comparative processes of results difficult. Rather the results should be seen as contributions to a colorful and multifaceted picture of contemporary e-learning initiatives and activities.

The participating countries' points of departure for their research take three different perspectives.

1. The perspective of *true and false*. Here the research question is generated from an interest to reveal whether a particular technology enhanceslearning or not.

The research design will follow this logic in theoretical framework as well as in methodology. The subprojects following this approach have conducted a quantitative survey of questionnaires followed by interviews.

2. The perspective of *efficiency*. Here the research question is generated from an interest to reveal to what extenta particular technology makes a learning process more effective. The research design will support the hypothesis that technology is effective, but not all teaching practices are equally effective. The research design will follow this logic in theoretical framework as well as in methodology. The subprojects following this approach have conducted a quantitative survey of questionnaires.

3. The perspective of *change*. Here the research question is generated from an interest to revealnew knowledge of how technology affect teaching and learning practices, how pedagogies undergo changes and how learners develop new learning behavior and thereby create new learning cultures. The research design will follow this logic in theoreticalframework as well as in methodology. The subprojects following this approach have conducted pilot studies of different practices supported by observations and interpretations of particular situations.

Collectively, the different research paradigms reveal an awarenessof ubiquitous technology and learning in a multifaceted way. Not only do they reveal knowledge in the chosen fields, they also reveal important knowledge about how digital trends develop and disseminate under diverse conditions and take different focus in national ventures in the area of lifelong learning. Thus, the contributions from the participating countries are shared results from their national research.

## 2.1 Different genres of writing or reporting

The diversity of research approaches are also revealed in the genres of contribution.

There are two reporting styles represented in this publication:

One style is *a report*. In the report many data are included and written forward in the text where it has been chosen to present a lot of tables and interim results in the main text.

One style is *an article*. In the article the data are used and implicit referencedin the discussion and will typically refer to an underlying report.

The group of participants has decided to maintain the diversity of the research approaches as well as of the reporting styles, since both emphasize the diversity of projects and also reflect the circumstances of which different countries implement e-learning as well as lifelong learning.

# Chapter 3 The contributors' perspective

In the following section the main research interests and research objects of the subprojects are presented.

## 3.1 South Korea

The South Korean contribution has two overall prospects for the study:

1. *A prospect for technological achievements* focuses on providing needed learning materials after understanding learners' adaptive learning.

2. *A prospect for the learning achievements* in the ubiquitous age. The word u-learning has been coined and the South Korean government has been making various efforts to realize this. U-learning enables and motivates learners to learn anywhere and at any time while tailoring curriculum for them to study on their own. In short, it is learner-centred.

The South Korean study gives an overview of national initiatives regarding the implementation of e-learning in lifelong learning; followed by the results of a needs analysis aiming to provide recommendations for further development in the its education system. The concepts ofubiquity are introduced with regards to the technological opportunities and potential for implementation in education programs and followed by the needs analysis, which was conducted on learners at lifelong learning institutions (open universities, cyber universities and centers for lifelong learning), and education professionals, including teachers and educators who design lifelong learning programs. The potential learning achievements for lifelong learning are emphasized becausepeople in different phases and places of life are especially assumed to benefit from ubiquitous technology, and strategies for enhancing effective use of e-learning for lifelong learning in the ubiquitous society are suggested. The South Korean context is unique because of the six participating countries, it is the only one that has initiated a country-wide groundwork to create a ubiquitous learning environment (i.e. u-Korea; started in 2005).

The South Korean study reveals that there is a higher degree of participation among those with higher qualifications, and a high e-learning activity among retired citizens. While the elderly use desktop computers, the younger have diverse patterns of mobile technologies. Women, regardless of age, appear poorly represented as e-learners as well as u-learners.

The study seems to reveal a profile of the u-learner as a well-educated young man, who has access to and uses smart technology, and a greater desire than the less privileged to take part in mobile learning activities. The study expresses the im-

portance to ensure wide-scale accessibility and recognizes that self-initiative is critical to sustain u-learning efforts, especially from the perspective of the learner. The actual educational value of technologies,and not merely the technological tools themselves, also need to be examined.

## 3.2 Malaysia

The Malaysian contribution's overall prospect for the study is to identify a means to realize ubiquitous learning. The study reveals results of the impact of e-learning materials and whether this leads to implementing ubiquitous learning at Open University Malaysia (OUM).

The current situation in Malaysian e-learning in lifelong learning is positioned between desktop learning and mobile learning. OUM conducts academic programs via a blended pedagogical approach that combines online learning, face-to-face tutorials and self-managed learning and the e-learning activities are organized around a learning management system.

The field of study is based on a group of undergraduate learners enrolled in one compulsory core course, i.e. "Learning Skills for Open and Distance Learners". The objects of study are understood through a conceptual model which divides the investigation of learner behavior into five constructs: perceived usefulness, perceived ease of use, attitude, computer anxiety, and computer self-efficacy.

The results of the study revealed several factors that affect the degree of success in e-learning. However, one significant factor is that the perception of usefulness is crucial for usage of e-learning materials. Together with a top five of the most serious barriers for using e-learning materials: (i) *technological and academic support* (ii) *demand for time and effort* (iii) *interface, navigation and platform problems*

(iv) *awareness of e-learning materials* and (v) *costs of devices and Internet access*, the perception of usefulness appears to be a well-accepted, but important factor for making future recommendations to reach a successful level of implementation of ubiquitous learning. What is more surprising is that an individuals' age does not appear to make any difference in use of e-learning.

The study concludes that the next step from e-learning should be ubiquitous learning because learner perception towards e-learning is high; learners are receptive to e-learning and ready for m-learning. The recommendations are directed at creating proper learning resources, i.e. applications to run on mobile devices, extending existing capabilities as well as exploring new opportunities to enhance the capabilities of mobile devices in delivering its learning materials to learners.

The main suggestions obtained from the survey all point in the direction of more profound initiatives for the area of lifelong learning aimed at all target groups. It goes for development oflearning-teaching models to promote u-learning in lifelong learning support for those social groups that are left out of the ubiquitous learning environment; educational support not only to ensure u-learning accessibility, but also to enhance learners'self-initiative; educational assessment of technologies, not just related to their use as a tool – a finding that agrees with the South Korean study. This also indicates a new opportunity for more in-depth research. Additionally, the OUM study also indicates that Malaysians consider the perceived usefulness of learning tools as the most important factor that influences uptake.

## 3.3 Latvia

The Latvian contribution deals with ubiquitous technologies by studying students'perceptions of technology use and interactivity in e-learning at higher education institutions. The overall prospect of the Latvian study is to explore the impact of

social presence as a mediating factor in e-learning. The study investigatesd if there is an effect of social presence on students' benefit from e-learning.

The study's focus on social presence is derived from Garrison, Anderson and Archer's Teaching and Learning Transaction Model of e-learning, of which the three main components are social presence, teaching presence, and cognitive presence (Garrison et al., 2000). In the Latvian study, focus is given to the social presence component, which is defined as theparticipants'ability to project themselves socially and emotionally through the medium of communication used.

The Latvian study was conducted through an online questionnaire comprising 100 students of higher education institutions. The questionnaire contained closed as well as open-ended questions; with some questions that address the students and their perceptions of e-learning, and other questions based on Garrison et al.'s categories and indicators of social, teaching, and cognitive presence.

The results of the study showed that many students had chosen e-learning because of the possibility of learning autonomously and the ability to flexibly combine studies with work. The problems they could meet in e-learning were often related to time planning or the possibility of contact with their lecturers. The Latvian students in the survey preferred to use a combination of e-learning and face-to-face-learning, and they would like the institutions to develop their use of various formats of learning resources in e-learning, including the use of videos and live online lectures. In this sense, the Latvian study appears to address some fundamental aspects in open and distance learning (ODL) delivery, whereby the right blend of e-learning and face-to-face interaction is important to ensure a comfortable and conducive teaching and learning environment for both students and their lecturers.

Regarding the development of social presence, more students answered that they felt a sense of belonging to the course through the online communication; however they did not develop distinct impressions of their online classmates, and their attitude

was generally neutral towards the activity of communicating online and collaborating in groups.

The Latvian study confirms the importance of certain elements of social presence in e-learning and concludes with pointing at implications for future research studies to conduct deeper analysis with a larger number of respondents in order to discover more details of the interconnections betweenteaching presence, social presence, and cognitive presence.

## 3.4 Thailand

The overall prospect of the contribution from Thailand is to determine whether integrated use of ubiquitous technologies in learning may or may not lead to development of social awareness. The Thai study involvesa project to develop road safety awareness involving selected schools and local communities. Unlike the other five participating countries, the Thailand contribution can be said to be the most unique in that it addresses education in an informal setting. The project comprised development of interactive media, training of teachers, and establishment of a ubiquitous learning community. The project was carried out in a number of schools, where students and the local community performed learning tasks related to road safety, recorded sound and video with their mobile devices and created digital stories.

The purpose of the Thailand study was first of all to design a framework of learning from school to community and develop interactive media for a ubiquitous learning community; and second to study the effects of interactive media for a road safety social awareness project in a ubiquitous learning environment.

Building upon pedagogical-didactic considerations on how to design educational activities –e.g. that if videos are followed by post-viewing discussions, they are more

likely to produce attitude change –the Thailand project was carried out in two phases. The first phase was conducted through a qualitative research approach building on focus groups with various participant groups like drivers, pedestrians, police, students, and teachers; followed by focus groups with various experts in learning, technology and road safety. In the second phase a number of interactive media, and a teacher training program, were developed through a participatory approach.

The aim of the Thailand project was to develop forms of interactive media, on the grounds that ubiquitous computing and learning has focused on technology that should fit the human environment, and that the interactive media should be used with different ubiquitous devices, such as tablets/pads, smartphones, and boards.

Some of the experiences from the project were that an interactive class environment was initiated through a game-based learning approach. In the teacher training program, lesson plans were developed that required students to explore their community problems, and become actively involve with the issues. The research group discovered that games-based and challenge-based learning yielded more positive response than a unidirectional instruction from teachers –representing the potential to use this approach to encourage greater interaction between teachers, students as well as the community. The future prospect for the project is to develop nationwide activities and embark on more in-depth study of communication via interactive media.

## 3.5 Denmark

The Danish contribution is a pre-study for a larger project and takes its point of departure in a discussion of how knowledge building is facilitated when using various learning forms of digital media. Here, ubiquity and learning is addressed from the perspective of utilization of video – the use of *video productions* in education – and the contribution is a qualitative study drawing on theoretical discussions of key

notions of multimodality and didactic designs as well as future challenges exemplified by two empirical cases.

The use of video productions is investigated from two distinct, but complementary perspectives: one, where the students become the designers of their own learning processes, and the other, where to a certain extent they become creators of their own learning resources.

The first perspective is: *Students' use and re-use of teachers' or others' existing video productions*, e.g. as video-streamed teaching sessions, interviews or lectures, or short YouTube video resources. Some of these may be created with the specific teaching situation in mind;others may be video productions originating from non-educational contexts.

The second perspective is: *Students' use and development of own digital and multimodal video productions*,e.g. as video diaries, video presentations or video dialogues. These digital and multimodal video productions can act as a tool for reflection on theory and practice.

The Danish study consists of a literature review and two empirical cases. The literature review aimed toa theoretical framework for understanding how the conditions for learning processes change in light of the constant evolution of digital technologies and how they can be met from an educational and instructive approach. The two empirical cases of the study reveal knowledge of students'development of learning strategies to benefit from the characteristics of digital media. This includes how to transfer existing videos into one's own learning resources as well as how to make video productions into a working tool for investigating one's own profession on location. Both cases expose that knowledge building is a complex of digital technologies, multimodality, learning content, the learners' use and reuse of technology and didactic designs. As a whole, the study reveals the emergence of ubiquitous learners as creators of learning resources and negotiators of knowledge management.

## 3.6 Slovakia

The Slovakian contribution gives an insight into the significance of the local context of e-learning for an approach to ubiquitous learning. The Slovakian study is a critical analysis of the development of e-learning in Slovakia and the features that may characterise ubiquitous learning environments.

Distance education (as a pre-cursor for e-learning) has not played a big part in adult education in Slovakia, and the demand of e-learning is hampered by low internet penetration. Household internet connectivity is among the lowest in Europe; however, Slovak citizens are active internet users within the limits set by the infrastructure.

A framework of lifelong learning, including a system of recognition and validation of non-formal competences, is gradually being introduced in Slovakia. A number of local centres provide access to distance education at various levels. There are initiatives to develop digital literacy and create freely accessible educational content. E-learning is generally perceived quite positively, but at the time of writing, Slovakia was still missing a common national strategy for integrating ICT in education.

The Slovakian study presents a number of public and private e-learning initiatives during recent years. Ubiquitous learning is characterized by providing intuitive ways for identifying collaborators, contents and services at the right place and time based on the surrounding context of the learners. The study points out features of ubiquitous learning environments as:

- accessibility and permanency of work, documents, data, videos, that are stored and available from anywhere,
- immediacy andadaptability to the context and the ways of access,
- interactivity with experts, teachers or peers, and situating learning as embedded in daily life, making computing available in all facets of everyday life.

## 3.7 Further perspectives

The six contributions show a field that in no way shows a clear picture of how the opportunities and challenges of ubiquitous technologies in learning are and can be met. However, they provide important knowledge of interests and ventures of the different countries. Obviously, each country represents a different level of development, with often unique ways of characterizing e-learning, lifelong learning and u-learning based on national aspirations and socio-cultural notions. These contribute to their different conceptualizations of a u-learning environment, or rather in most cases, what u-learning should entail. These research reports represent an opportunity for each country to discover new ideas and prospects that may be considered or adapted in their own educational initiatives and contexts.

Although involving only six studies, each country has contributed a different facet of education, thus indicating that ubiquitous learning can indeed be all-encompassing and comprehensive to include all levels of learning, from informal learning totertiary education. However, it must be iterated that all six countries, to varying degrees, acknowledge that higher education institutions best represent the a potential where u-learning and a ubiquitous environment can be fostered and created and each also indicates the value of mobile devices and interactive media in this endeavor. This clearly reflects universities' capacity for research and innovation as a main driver to study the various aspects of u-learning.

Overall, while achieving ubiquity in educationis still something that will require time and effort at both institutional and national levels for a majority of the countriesrepresented in this publication, it is clear that the use of e-learning technology will be a critical requisite for any u-learning initiative to advance.At this juncture, the role of ODL institutions – some of which, like OUM and Korea National Open University (KNOU), are represented here in e-ASEM – is likely to be influential.

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# E-learning Expectations for Korea's Lifelong Learning in the "Ubiquitous Society"

02

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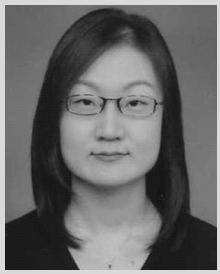
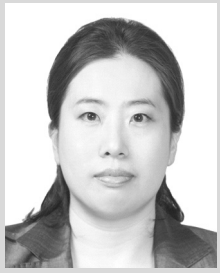


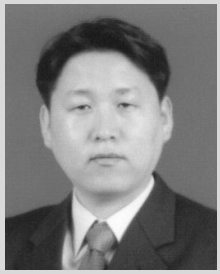
Younghee Woo has been working as a researcher at the Institute of Distance Education, Korea National Open University and the e-ASEM research network administrator since 2010. Dr. Woo completed her Ph.Ddegree in 2006 in the Department of Educational Psychology and Instructional Technology at The University of Georgia in U.S. She has published articles centered on Meaningful online learning, Authentic task and Learning Management system. Currently, she is doing research on Web 2.0 and Competencies of Instructional Designer, and U-learning. And she has taught several subjects such as Instructional Design, Theory and Practices of e-learning and Need Analysis for e-learning.

## Jinhee Kwon



Jinhee Kwon worked as a researcher at the Institute of Distance Education, Korea National Open University for 8 years. She was a visiting scholar at Pennsylvania State University in U.S in 2011. Dr. Kwon received her Ph.D degree in Lifelong Education at Seoul National University in Korea. She has published articles centered on Student retention in distance higher education, Learner support program in open and distance learning. Currently, she is doing research on Elderly learners in adult education and Adult learning community. And she has taught several subjects such as Educational Gerontology, Programming in Adult Education and Adult Learning Theory.

## Jong-O Park



Jong-O Park is a chief program specialist and a team manager of information management team in center for organizational management at National Institute of Lifelong Education which is a national government funded institution established to promote the lifelong education in Korea. Dr. Park holds his doctoral degree in computer education from Korea National University of Education (Ph. D and M. ed.), and has been working as a researcher since 2005. He worked as a fellow researcher at the Institute of Distance Education, Korea National Open University.

# I Introduction

## I.1 Need and purpose of research

Internet and web technology has become one of the most effective teaching and learning tools, and e-learning is being increasingly perceived as a critical part of the learning environment. At the same time, education and training are now regarded as lifelong processes. As a result, e-learning that allows access to learning opportunities regardless of time and space is being promoted as a learning model for adults pursuing lifelong education.

Lifelong learning has been rapidly developing in South Korea since 2000 with government support. It has increased social integration and national competitiveness through the creation of a lifelong learning society, which enables everyone to learn anywhere and at anytime through centers for lifelong learning in universities and provinces. E-learning has been widely used over the entire span of lifelong learning, from school education to career training and re-employment services, since six governmental bodies started cooperating following the passage of the E-learning Industry Promotion Act by the Ministry of Education, Science and Technology in 2009. At present, information communication technology (ICT) is one of the platforms used to implement lifelong learning, and e-learning is regarded as a strategy to achieve lifelong learning because it reduces the distance between instructors and students, as well as the distance among students. Furthermore, it has been proven effective in improving educational quality through standardization and open education.

E-learning has become an integral part of lifelong learning, and its program development and application is being accepted without resistance. E-learning differs from conventional learning in three critical ways: it can take place anywhere a computer can be connected to the Internet; content from e-learning sites is consistent and qual-

ity-assured, and; content is not fixed but adapted to each learners' level and style. Even the process of finding information and forming knowledge through e-learning exhibits individuality and activeness (Jung, Choi, Baik, 2010).

In the ubiquitous society with the advent of these e-learning characteristics and the recent rapid development of technologies, such as mobile technology and ubiquitous computing, the idea of lifelong learning society has been realized. Anybody can engage in learning anywhere at any time. The word "ubiquitous" means being and existing everywhere at the same time, and ubiquitous computing is a technology that provides needed information and services to users on the spot: various computational devices are pervasive in people, objects and environments to connect anywhere at any time. Unlike existing e-learning, the ubiquitous environment enables learning to take place beyond the limits of cyberspace or physical space with the help of ubiquitous computing technologies. Moreover, it provides curriculum that is tailored and adapted to learners, which can better satisfy lifelong learners. Nonetheless, e-learning in the ubiquitous society is not made from nothing.

One needs to first understand the meaning and the features of ubiquitous computing and grasp the demands of e-learning in the ubiquitous society, such as the conditions and preferences of learners, and then design and develop programs accordingly to operate effective lifelong learning programs..

There is a need to design and develop e-learning programs that can enhance the benefits of the ubiquitous society by moving beyond uniform e-learning methods that merely upload existing content onto the web. To this end, an in-depth study should be conducted on members of lifelong learning institutes to find out how they envision e-learning for lifelong learning in the ubiquitous society. For this study, a needs analysis for e-learning was conducted on learners at lifelong learning institutes (open universities, cyber universities and centers for lifelong learning), and education professionals, including teachers and lifelong educators who design lifelong learning programs. Finally, strategies for the effective use of e-learning for lifelong learning in ubiquitous society are suggested.

## I.2 Research Process

### 1) Concept define of ubiquitous society and lifelong learning

The concepts of ubiquity and a ubiquitous learning environment are defined and the features of u-learning are examined. In addition, a preliminary study was conducted on the status of lifelong learning information systems in Korea, and to investigate and analyze supply and demand for lifelong learning programs.

### 2) Fact analysis of e-learning participation in lifelong learning

Through the structured questionnaires, program profiles and participation rates by lifelong learning participants' type were analyzed. Learners' e-learning experience, e-learning methods and environments, and their learning tools were examined and analyzed according to gender, age, occupation, wage, and learning style.

### 3) E-learning needs analysis in a ubiquitous environment

A needs analysis for u-learning participation and activation was conducted on learners, lifelong educators and teachers. On the basis of this, recommendations for improving ubiquitous learning environments for lifelong learning in Korea were made.

# II Theoretical background

## II.1 Ubiquitous environment

The concept of the ubiquitous environment is often heard and read in the media. It emphasizes access to any service via any communication device through any com-

munication networks anywhere and at any time. The concept is pervasive and includes words such as u-learning, u-government, u-city, u-health, and u-shopping. Lifelong learning is no exception and the ubiquitous environment has been much discussed as the most optimal method to realize lifelong learning (Jae Bun Lee et al, 2006; Dong Man Lee, Sang Hee Lee, 2009).

### 1) Ubiquitous environment and u-learning

The word "ubiquitous" derives from the Latin word "*ubique*" and means "being and existing everywhere at the same time." It is used here to indicate an environment where one can use various information communication services while getting access regardless of time and space through a network. Ubiquitous networking technology integrates various objects with computer and information communication technologies, allowing users to communicate with them anywhere and at any time. As a result, this is understood as the concept expression of an information communication technology, and various terms such as "ubiquitous computing," "ubiquitous networking," "ubiquitous IT", and "ubiquitous society" – which have a more comprehensive meaning – are used with no clear demarcation (Jae Yun Kim, Ki Duk Kwon, Jin Hwa Lim, 2004). The characteristics of this ubiquitous environment are omnipresence, intelligence and constancy (Son Mi, 2007).

"Omnipresence" is the interconnection between computational devices and various other objects and places with an emphasis on communication between people and objects or among the objects. One way to emphasize this feature is to embed computational functions in the objects or to enhance the portability or mobility of the objects. One example of this is to turn off a light or control the temperature of a house via a mobile phone while outside the house.

"Intelligence" occurs when computational devices actively perceiving and responding to environments and situations. This is the greatest difference between conventional computing and ubiquitous computing: computers perceiving the environment, providing the needed environment for users, and taking necessary actions while making its own judgement. For example, the computer inside a refrigerator inspects food inside and restocks what has run out, such as milk and vegetables. Providing needed

learning materials after understanding learners' adaptive learning can become another example of intelligence.

"Constancy" denotes a switch from the grid computing environment, which is dependent on time and space, to the state of being able to access a network anywhere (Electronic Newspaper, 2005). With the introduction of smart phones and smart tablets, many people already experience the constancy of ubiquitous environments.

With these three characteristics, the ubiquitous environment brings about many changes in educational environments. The word "u-learning," which means learning in the ubiquitous age, has been coined and the government has been making various efforts to realize this. U-learning enables and motivates learners to learn anywhere and at any time while tailoring curriculum to them to study on their own. In short, it is learner-centered.

The u-learning environment can utilize a learner's living environment as learning resource and is a friendly environment where acquired knowledge pervades in real life. On the premises of an educational environment where learners can learn anywhere and at any time with any device, u-learning offers educational courses that are creative and learner-centered. Hence, with the use of distance education and outdoor classrooms, which are beyond the boundaries of traditional classrooms, u-learning enables optimal learning that is tailored to learners' age and styles with no restrictions in time and space. Learners use the network inside and outside the classroom while absorbing lecture content vividly in dialog format, and distance learners use ubiquitous technologies to take and review lectures.

U-learning has several features that are different from e-learning (Guen Sang Park et al, 2007; Dong Man Lee, Sang Hui Lee, 2009). Firstly, while e-learning uses cable Internet and the web technology, u-learning uses wireless Internet, augmented reality and virtual web-technology. Secondly, e-learning is based on the network between computers whereas u-learning is based on the network between wireless devices, acquiring the information of learners' locations and needed information on the spot through sensors, chips and tags installed in the devices. It is a form of learning that acquires information from both learners and objects. Kwak (2009) indentifies six new impacts of u-learning. Firstly, there will be less dependence on

educational venues and devices. With the expansion and improvement of information communication networks, and various media-learning supports, learning is made possible by connecting to a network is possible through devices other than a computer, such as TV, mobile phone, and e-books devices.

Secondly, it is possible to shift from the pull model to the push model. The pull model, in which learners had to access the learning environment intentionally, was less effective for those with weak motivation or those in disruptive learning environments. On the other hand, in an environment where access to learning is possible anywhere and at any time, it is possible to have tailored education (the push model) that accommodates educational needs for learners on the spot anywhere.

Thirdly, it is possible to observe learners through intelligent devices and offer tailored information to their levels. This can be used to arouse learning interests and induce learning.

Fourthly, individualized instruction in general is easier and with the development of individualized education, the expansion of distance education has become less problematic. Group education enables the operation of various educational programs according to learners' interests and their academic achievements, and provides learning methods according to the learners' levels using intelligent programs.

Fifthly, education will not end as a one-off but will develop into various methods in different places. In particular, it can provide education in an integrated form of various resources, going beyond the limitations of physical space called schools.

Sixthly, as permanent and various assessment systems are made possible, the continuous improvement of educational methods can be carried out along with a feedback system that gauges learners' aptitudes. Collaborative learning can take place actively and with the improvement of accessibility, expert knowledge can be widely used in education.

### 2) Ubiquitous environment and lifelong learning

Lifelong learning is education from the cradle to the grave, covering formal, informal and non-formal education. Hence, rather than being another field of education, it is a transformation in perspective away from the concept of education being

something restricted to schools (Dodds, 2003). In the past, we used to believe that education and learning were confined to school, and did not recognize the value of non-formal education. However, as learning breaks the boundaries of schools and the importance of lifetime learning has come to the fore, the value of non-formal education, which focuses on day-to-day life and livelihood outside of formal education, is increasing (Jae Bun Lee et al, 2006).

Learning is not confined to school. People also experience and acquire new knowledge and skills from television, reading books, surfing the net or conversations (Albeit & Dausien, 2002). Combining the characteristics of lifelong learning, which happens in various forms in a lifetime, and new innovations of Internet communication technology, lifelong learning with the use of ICT has been in the limelight. The lifelong learning and e-learning with the use of ICT have been growing rapidly since 2002 with the help from the government. The Korean government judged lifelong learning which happens anywhere and at anytime.

As mentioned in the previous chapter, the omnipresence, constancy, and intelligence of a ubiquitous environment, provide for not only the expansion and automation of a learning environment but are also sources of diverse knowledge and a broad array of learning choices. This, in turn, leads to the diversification of education, transcending the fixed content of educational curricula and allowing for the diversification of learning styles and models, as well as flexibility in learning management through information communication technology. Through this, a learner-centered lifelong learning environment will be realized and the quality of lifelong learning will be high with the emergence of new learning communities (Jae Bun Lee et al, 2006).

## II.2 Lifelong learning trends in the ubiquitous society

Ubiquitous computing does not end with simply improving the computer environment. It is expected to change the topography and culture of learning.

Countries with advanced computerization advocate for the establishment of ubiquitous environments at the municipal and central government levels. With the expansion of educational services via mobile devices, the market for u-learning education has grown (Sang Oh Yeoun, 2008).

The main changes for lifelong learning systems, and teaching and learning in the ubiquitous society are as follows.

Firstly, the openness and development of lifelong learning systems and policies has been promoted as flexible, unlike the institutionalized system with only one route: individualized learning tailored to learning conditions, hours, space and schedule has become possible. Breaking away from the paradigm of delivering the educational contents, support for "autonomous learning" that can develop learners' aptitudes according to their contexts has been emphasized (Lim, So & Tan: 2010). As a result, there has been increasing interest in systemic devices, as well as teaching and learning models that enables flexible and individualized learning.

Secondly, with the development of ubiquitous technologies, great emphasis has been placed on critical judgment of information technology along with skills for making good use of online learning technologies. Not only has the importance of tool literacy – such as computer literacy, network literacy and technology literacy – been emphasized but also the ability to produce, evaluate and interpret information that has been delivered via various devices. Furthermore, critical research in and the importance of learning information technology at the social and cultural level have been also stressed (Kerka, 2000).

With regard to the digital divide, efforts to promote the educational use of and access to technologies by different groups and economic backgrounds are being made. Examples include the U.S. non-profit educational organization called Seniornet, which contributes to the use and supply of online learning technologies for the elderly, and the Ansan support center for migrant workers in Korea, which runs educational programs to promote the use of media for migrant workers.

Thirdly, interactive learning and learning via a network are active. Independent and isolated distance learning in the industrial age has been replaced by interactive and

collaborative learning, which is based on different mobile media, social networking services and information communication infrastructure. In the same vein, there have been efforts, made to promote human interactive learning in the e-learning system development for lifelong learning. “Human e-learning” and “peer to peer e-learning” at Japan’s Yashimagakuen University are the main examples of this effort (Yamamoto, Takumi, & Matsuo, 2009).

Fourthly, lifelong learning pursues diversification and holism. As the routes for informal and non-formal education increase, knowledge, attitudes and skills acquired from them is increasingly recognized. The research, development and application of technology that can supervise and accumulate daily learning is expanding. As part of this effort, tools such as ”lifelong learning organisers (LLOs)” that support an individual’s learning experience, educational resources, records, organization and publication, are being developed. A few quintessential examples that show the trend of lifelong learning in the ubiquitous environment are as follows.

### ○ Open Educational Resources (OER)

Open Educational Resources means free digital resources that are open to the public for the research and learning of educators, students and autodidacts. OER includes learning content, content development and use, needed software for distribution and necessary measures for copyrights. The number of OER projects and activists, and the amount of educational resources, are rapidly increasing. From 2006 to date, 3,000 kinds of open courseware have been offered from approximately 300 universities around the globe (OECD, 2007). When looking at the background of sharing resources freely, first and foremost it is easier to produce content as user-friendly IT infrastructure, software and hardware that is accessible at a low cost. Sharing of the educational contents also lowers the production cost. Copyright for free content sharing and use has not been solved legally and there is high social reliance on content sharing. In the eyes of the government, OER offers opportunities for higher education to those who have not received the benefits and has become an effective tool for advertising private and public lifelong learning programs. It can be used to narrow the gap between informal education and

formal education. Furthermore, for educational institutes knowledge sharing can help them commit to their true traditions and purpose while improving the quality of their contents and lowering the costs. Since OER is effective in itself in advertising an institute it can stimulate the development of new educational resources and internal innovations, contributing towards the promotion of competitiveness. Hence, the scope of applying open license to secure sharing and using resources whose copyrights have been protected in cyberspace has been expanding without any risk of copyright infringement (OECD, 2007).

When looking at policy implications of OER, copyright regulation, interoperability and establishing a knowledge base of OER activities have become the educational issues at a national level. The expansion of OER also bridges the gap between the formal and informal education. Hence, the establishment of lifelong learning programs, the diversification of educational resources and supply channels with the use of OER have become important tasks (Hylén, 2008).

Active application of OER also breaks the boundaries between educational content, users and developers. This occurs not only in organizations but also in individuals as it opens opportunities to take part in knowledge creation and sharing independently. Hence, the quality control of OER content and the easing on copyright policies remain as major tasks.

### ○ Seniornet in the U.S. (http://www.seniornet.org/)

With the rapid advancement of computerization, even senior citizens use the computer for various purposes. Seniornet in the U.S is a non-profit organization that teaches the elderly how to use computers and the Internet in order to improve the quality of their lives and allow them to share wisdom and knowledge.

At first, Seniornet focused on computer education for the elderly but as it developed over the years, it now offers educational programs that satisfy the various educational needs of elderly people. Its members can freely use any Seniornet center throughout U.S. to receive basic computer education and also access advanced programs, such as computer statistics, graphics, personal financial management, tax filing,, etc. Senior citizens first learn how to use computer and then learn how to use it to learn what's

needed in real life. Seniornet provides educational services throughout the United States through regional learning centers and an online learning center, offering about 300 courses.

The first level offered by Seniornet at its online learning center is ”learn more about your computer,” which teaches how to navigate a computer and Microsoft word and excel programs. The second level is ”get connected,“ which teaches how to get connected to the Internet and social networking tools, such as email and Facebook, to connect with families and friends. The third level is ”explore the World,” which allows learners to use web-based educational programs recommended by the lecturers and staff.

When looking at the implications of Seniornet on lifelong learning in the ubiquitous society, it does not end at teaching how to use various information communication technologies, but also introduces and connects seniors to educational activities offered on the web. It has designed educational courses suitable for the physical, psychological and social characteristics of elderly learners through online and offline learning centers, creating a learner-centered system. In addition, with moderate pricing, it ensures educational access without creating class barriers.

### ○ ‘Lifelong Learning Organizers (LLOs)

The British government established a consulting agency to set national strategies for non-formal education for adults in the 21st century that would contribute to the welfare and prosperity of society. Among the agenda items is promoting the connection among different learning episodes (DIUS 2008; Vavoula & Sharples 2009: 82, recitation). It aims to integrate various learning experiences in different contexts by combining technologies, knowledge and learning resources, while capturing, connecting, organizing and recycling learning episodes. This process is called “lifelong learning organizers (LLOs).” It can be defined as a system which helps a learner organize and integrate his/her meaning records of lifetime by categorizing the activities, knowledge and materials of his/her learning, which took place at different time periods and places into specific learning topics (Vavoula & Sharples 2009).

LLOs’ can be a very effective tool for autonomous and self-regulating learners. The

LLO system is based on a technology that connects learning behaviors, learning episodes, and learning projects to their contexts and content. In today's ubiquitous age, the LLO system is expected to promote self-directed learning while allowing people to organize the acquired knowledge, learning experiences and resources. However, since people do not use the technologies following the method given by a system developer, the diversity of learners and the linking of their learning outcomes to sharing systems have become issues. Moreover, educational issues which are more than technological issues, such as the revision and removal of learning records, an issue of a new replacement learning record system need to be continually researched. The ubiquitous society has not yet been completely formed, but it can be realized under through the advancement of information technology, nanotechnology and biotechnology, which can be applied to everyday objects. In the ubiquitous society three prospects for lifelong learning will require attention from related scientific and practical fields (Su Kyeung Lee et al., 2007)

Firstly, they have to be approached not from the perspective of lifelong learning technologies, regulations and rationales, but from an educational rationale. Ways where a ubiquitous learning environment can contribute towards a learner's autonomous development and growth need to be explored. When seeking the development of u-learning, development based on the educational rationale focusing on the learner's development and growth needs to be sought, rather than one based on an economic rationale.

Secondly, attention needs to be given to the educational issues within technological progress, apart from positive prospects for lifelong learning. The examples of this are class background, age, educational gaps and information literacy. The issue of equal access to educational resources also needs critical attention.

Thirdly, there is a need for standards and research on various educational and ethical issues for active educational interaction. Issues such as copyright with regard to promoting information sharing, personal information protection, and standards for managing various personal learning records need to be discussed.

## II.3 Lifelong learning trends in Korea

In Korea, u-learning is getting attention as a new educational paradigm to raise autonomous and creative talent for the information-oriented society. Some research has suggested a paradigm change will remake education (OECD, 2001, Jae Bun Lee et al, 2006, Hye Young Lee et al, 2008). The OECD predicts that demand for individual educational services to develop autonomous and creative learning abilities in diverse consumers will rise and schools will develop into regional learning centers, re-schooling, networking and de-schooling (OECD, 2001). Future schools will have an open model of recurrent education. It has been suggested that systems such as academic years and grades will no longer be used, and that the school system will be based on programs rather than schools: schools will be used as learning centers connected by networks (Hye Young Lee et al, 2008). Meanwhile, lifelong learning will play a very positive role in responding to numerous integral factors within society, such as formal and non-formal education for adults (Soo Myoung Chang, 2009). Korea has ample IT infrastructure is an IT developed country, while the government promotes the expansion of continuous connectivity, higher speed, and the development of experimental models. After the 1990s, Korea has had a comprehensive strategic plan for computerization, such as e-Korea and u-Korea (ubiquitous Korea). The establishment of a ubiquitous environment at the national level was conducted along with the basic strategies of u-Korea in 2005, and post-ubiquitous strategies are being made and applied in each field. The master plan for information technology was developed and applied to education after 1996 in order to develop a nation with more creative talents. It has three levels: level 1 built the infrastructure (1996~2000); level 2 taught ICT use (2001~2005), and; level 3 introduced the u-learning system (2006~2010). In level 3, the advancement of infrastructure and information services and the expansion of computerization in lifelong learning and higher education were tried on the basis of the results of the first two levels, but the result has been unsatisfactory. Following the reorganization of the Ministry of Education, Technology and Science, the master plan for in-

formation technology in education was changed into a basic plan of information technology in education and science (the Ministry of Education, Science and Technology, 2010.5.25). A taskforce focusing on educational advancements, an educational consulting agency in the Presidential Council for Future and Vision, has suggested a need for 'establishment of u-learning support system' as a mid- and long-term measure, together with the expansion plan of EBSi to promote educational competitiveness. In November, 2010, the Council proposed a policy direction through a national u-learning TF for research of a national vision and strategy for ubiquitous learning in 2020, including policies to support higher education and lifelong learning by establishing a national u-learning system. However, there are not many cases of ubiquitous lifelong learning. The u-learning environment indicates a pan-national educational environment anywhere and at any time. This requires the establishment of infrastructure for an accessibility and operational environment for educational contents. In regard to accessibility, an education safety net that provides support for neglected people and as well as educational welfare should be considered. When compared with u-learning for entrance examinations, u-learning in job training and lifelong learning for self-improvement are scarce both in the public and private sectors.

### (1) Public sector

#### ○ Gyeonggi lifelong learning, homelearn

Homelearn (http://www.homelearn.go.kr) is an e-learning website provided by Gyeonggi women's development center that aims to help 12 million residents of the province reach self-realization by capacity building and self-improvement. It opened in May, 2010 and offers 500 free educational programs in five thematic areas: foreign languages, liberal arts, computer skills, management, and leadership. It has 150 thousands members. It has integrated existing e-learning programs in lifelong learning in 31 cities. In addition, it operates educational systems and courses that can satisfy various learners' needs in different cities and towns.


**Figure 1** Website of Homelearn

All educational content is free and since of its quality is high, the satisfaction rate of users is relatively high. With diverse educational courses and learning methods, the number of its users is expected to rise. Though it is an e-learning system based on the web, from May 2011 its service expanded to mobile devices. Gyeonggi province also opened a website, Gyeonggi lifelong learning portal path, in December 2010, offering services such as lifelong learning news, information of provincial lifelong learning institutes, and a pool of lecturers, lifelong learning clubs, and lifelong learning volunteering.

### ○ KOCW

KOCW (Korea Open CourseWare, http://www.kocw.net/) is a project for Korean open

courseware, based on MIT's OCW project. OCW is a kind of noblesse oblige, with an aim to share the ample knowledge of people. In 2002, MIT lectures were open to the public. Even though the intellectual properties and privilege of lecturers might get lower, in order to attract talented students and develop creative ideas that the society demands MIT tried to handle change in the educational environments of the Internet age through OCW. As a result, 1,900 subjects in 35 departments within MIT went public.

In Korea, Korea University and Kyunghee University started first in 2007, and in 2008 Korea Open courseware consortium was established. To date, 23 higher education institutes are the members of KOCW.


**Figure 2** Website of KOCW

KOCW's services have three purposes:

1) Expanding educational opportunities and promoting competitiveness in higher edu-

cation by establishing a national e-learning community;

2) Spreading the culture of knowledge-sharing among universities while sharing good lectures and the examples of excellent lecturers on the web; and
3) Expanding learners' right for learning and lifelong learning opportunities by improving access to college lectures.

The Korea education and research information service started KOCW in December 2007 as a pilot project. As of May 2011, 1,785 college lectures from Korea, 634 college lectures from overseas, and 119,392 general educational resources are offered. Teaching and learning materials offered by KOCW can be freely accessed through an application for both android and apple phones.

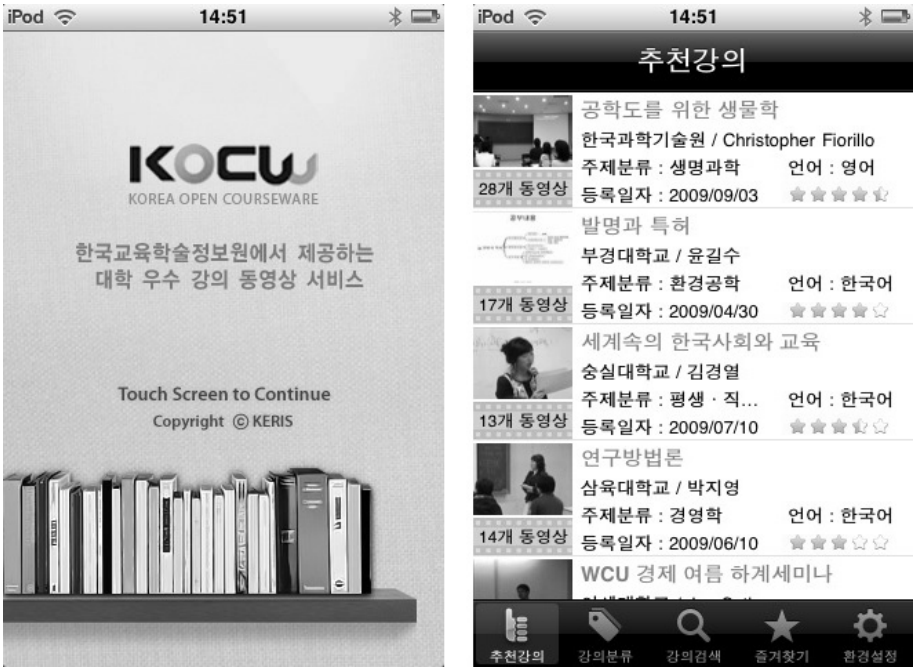



**Figure 3** Screen shot of the KOCW application

KOCW also offers OpenAPI and allows the development of applications and services to access their open lecture videos, domestic academic journals, overseas academic journals, and Ph.D. theses, without having to access their website. This allows external

developers and users to search and share KOCW data in standard XML form.

### (2) Educational Sector

In Korea, there are about 400 community colleges, universities, open universities and polytechnics. Many colleges have already installed Wi-Fi and Wibro networks inside their campuses creating a free wireless environment for mobile devices. Students can access vast amounts of information, from cafeteria menus to job vacancies, and perform multiple tasks, including registration, downloading lecture notes and submitting assignments. The use of u-learning in cyber universities is particularly active. At present, Korea National Open University and other 18 cyber universities as well as two distance lifelong learning facilities offer u-learning. All approved by the Ministry and can award associate bachelor degre. From 2001, lifelong learning facilities, which had operated as distance education, were given legal permission to be converted into cyber universities, following the passage of higher education and private school acts in October, 2007. In 2009, lifelong learning facilities became higher education institutes according to the Higher Education Act; they can operate a graduate school, exchange credits, and award dual degrees with overseas universities. They are also eligible to apply for the government funds and projects. As of April 2011, four cyber universities offer special graduate programs.

**Table 1** Operational statistics of cyber universities

| Division | Program | University | Year of establishment (Year of foundation) | Max. No. of Students (2011) | | Max. no. of students for special graduate programs (2011) | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Admission | Total | Year of Establishment | No. of graduate schools | Admission |
| Cyber University | Bachelor Degree | Kyunghee Cyber university | 2009 (2001) | 3,000 | 11,600 | 2011 | 2 | 140 |
| | | Kukje digital University | 2009 (2003) | 840 | 3,090 | | | |
| | | Daegu Cyber University | 2009 (2002) | 1,500 | 5,500 | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Busan Digital University | 2009 (2002) | 1,000 | 3,600 | | | |
| | | Cyber Korea Foreign Language University | 2009 (2004) | 1,600 | 6,400 | | | |
| | | Seoul Cyber University | 2009 (2001) | 3,000 | 10,900 | 2011 | 2 | 593 |
| | | Sejong Cyber University | 2009 (2001) | 1,800 | 5,860 | | | |
| | | Wongwang digital University | 2009 (2002) | 1,500 | 5,500 | 2011 | 2 | 48 |
| | | Korea cyber University | 2009 (2001) | 2,500 | 10,000 | | | |
| | | Korea cyber University | 2009 (2001) | 1,650 | 6,600 | | | |
| | | Hanyang Cyber University | 2009 (2002) | 3,150 | 11,750 | 2010 | 3 | 290 |
| | | Hwasin Cyber University | 2009 | 360 | 1,080 | | | |
| | | Digital Seoul Cultural Art University | 2010 (2002) | 990 | 3,980 | | | |
| | | Seoul Digital University | 2010 (2001) | 3,000 | 12,000 | | | |
| | | Global cyber University | 2010 | 635 | 1,125 | | | |
| | | Open Cyber University | 2011 (2001) | 1,000 | 4,000 | | | |
| | Associate bachelor degree | Youngjin Cyber University | 2010 (2002) | 1,200 | 2,000 | | | |
| | | Korea Welfare Cyber University | 2011 | 500 | 500 | | | |
| Total: 18 universities | | | | 29,225 | 105,485 | | | |
| Distance Lifelong Learning facilities | BA | Youngnam Cyber university | 2001 | 600 | 2,400 | | | |
| | Ass. BA | World Cyber University | 2001 | 1,300 | 2,600 | | | |
| Total: 2 universities | | | | 3,840 | 14,690 | | | |

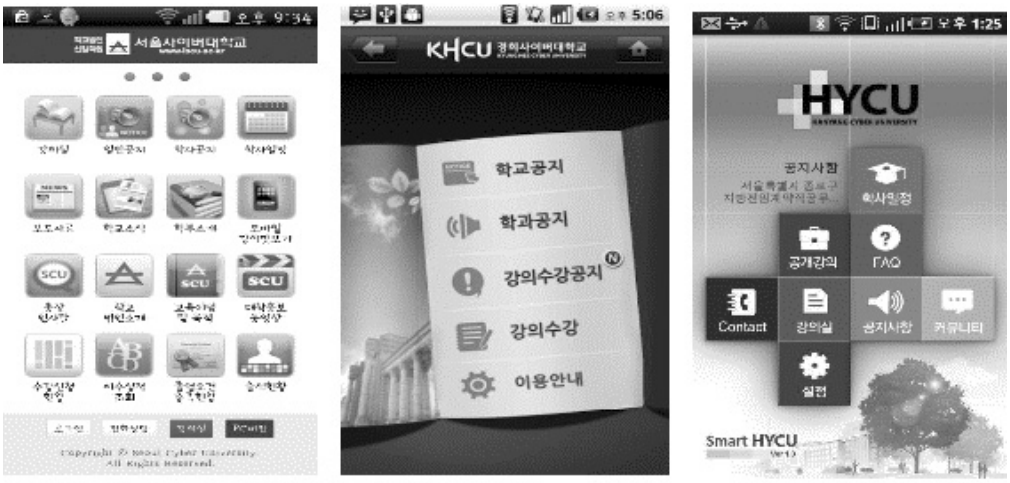



**Figure 4** Smart phone applications of cyber universities

Since cyber universities manage teaching and learning through distance education, they have been actively using e-learning technologies as a student service. Not only do they allow students to download lectures as MP3 format, they also support the preparation and revision of lectures through PDA/PMP/UMPC. In addition, students can access their class schedule and grades, and register for class through their mobile devices. Furthermore, some cyber universities offer educational contents through IPTV educational service channels in alliance with IPTV providers.

### (3) Private sector

The private sector was quicker to adopt ubiquitous lifelong learning than the public sector. With the development of mobile communication such as 3G and Wibro, the introduction of new information communication media such as DMB and IPTV, and the development of diverse information communication devices such as PMP, MID, netbooks and smart phones, old content is being converted for dissemination and new content created for new devices.

**Table 2** Cases of ubiquitous lifelong learning private educational services

| Company | Div | Service | Service period | Service contents | Subject | Device | Characteristics |
|---|---|---|---|---|---|---|---|
| KT | In-company training | | 2003~ present | Supplying a PDA to every employee and free membership to Nespot<br>Services to teach languages, leadership, job skills<br>Making a website for wireless network and acquiring professional licenses | Every employee | PDA | |
| Citibank | In-company training | | 2010~ present | Teaching employees finance-related expertise | Every employee | Smart phone | SNS connection |
| Winglish.com | Language education (contract, BtoC) | Satellite DMB | May 2005~ present | Portable satellite DMB service<br>English and Chinese language learning programs | Adults | Satellite DMB audio | 3times per day for 10 minutes or less |
| | | IPTV | July 2007~ present | IPTV commercial service through KT mega TV's two-way educational channel<br>Daily English for adults, TOIEC lectures, Basic English for children | Adults, children | Two-way IPTV | Due to the legislative issues of IPTV, there is a delay for commercial use |
| | | Reuters News English | Jan. 2010~ present | Learning English through Reuters Business News | | Smart phone | |
| | | OPIc BASIC | Jan. 2010~ present | 1:1 English speaking test | | Smart phone | |
| Chungdam learning | Languages | English Bean | Dec. 2009~ present | English conversation with topics in current issues for working adults | Adults | Smart phone Web-paper (Metro) | Differentiated service for different devices, synchronization |
| Ubion | Business management-related contents service (contract, BtoC) | SKT PDA Service PDA Sync service | 2002, 2003 | Nate PDA Service Comprehensive package product at iHandygo site | Adults | PDA | Service suspension due to low profit making |
| | | MP3&PMP Sync | 2005 | Due to the widespread of MP3players and PMP, offer free download service to existing users | Adults | MP3, PMP | Security problem (No. of download) |
| | | PSP Nespot-learning service | 2006 | Offering a PSP nespot service | Adults | PSP | Due to technical limitations such as encoding, it went as far as the pilot program |
| Telsk | Language education (Contract) | PMP use B-L service | Nov. 2006~Aug. 2007 | Decrease in learners' complaints who could not often access learning websites<br>Offering language learning contents such as TOEIC, | Adults (Staff) | PMP | Low rate of learning completion |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | English conversation, Chinese conversation | | | |
| SK Telecom | Mobile phone BtoC Service (excluding e-book service) | e-Book service | 2007 (but not yet operational) | Resolving problems occurring in mobile phones<br>Replacing elementary, middle, high school textbooks, distance learning application | Students, adults | e-Book reader | Newly developed |
| | | Melon language learning service | 2007~ present | Expanding content areas from music service with a fixed monthly fee, and offering EBS language contents | Students, adults | Mobile phone | 20, 000 users per month |
| | | Nate learning service | ~present | Offering various content, such as text messages and videos | Students, adults | Mobile phone | Using VM for more complicated services |
| LG U+ | School education | IPTV | April, 2010~ present | IPTVservice for school use, offering content for main curriculum, after-school programs, extracurricular activities | Elementary and middle school students | IPTV | USB type set-up box |
| Credu | Educational service (contract) BtoC service | Mobistmobile learning service | 2004 | Expanding mobile learning service areas,<br>Based on e-Learning educational service management know-how, support wired and wireless integrated educational services | Adults | PDA | Service suspension due to lack of profit and service areas |
| | | Wibro ubiquitous learning service | 2007~ present | Establishing a Wibro network and expanding users<br>Business management in liaison with KT, Content service in foreign languages and liberal arts | Adults | PDA, Wibro phone | Expanding Wibro network areas and developing content remain as future tasks |
| | | Credu application (Mobile learning training institute) | 2011~ present | Offering an exclusive application for credu educational services | | Smart phone | |

IPTV service provides its own operate educational channels. Some channels offer learning methods in tandem with the web. One distinguishing factor is that they do not provide the same teaching and learning environment since they embrace varying accessibilities for different devices and offer services through media integration. Educational content is offered through mobile devices, and Q&A, interaction and evaluation are conducted on the web. At present, mainly language education and job training are offered.

# Ⅲ Research Method

## Ⅲ.1 Literature review and case study

A literature review was conducted on the concepts and scope of ubiquitous lifelong learning, u-learning systems and e-learning needs analysis. To identify trends and conditions of ubiquitous lifelong learning in Korea, a case study was conducted in the public sector and private sectors while investigating the Korea's ubiquitous learning policymaking process.

## Ⅲ.2 Survey questionnaire

Survey questionnaires by type were designed to investigate e-learning and lifelong learning participation by learners, lifelong educators and professors, and to conduct an e-learning needs analysis for the ubiquitous environment. The survey questionnaire for learners consisted of four sections: respondents' profile and e-learning accessibility, their difficulties, participation, and suggestions. The survey questionnaire for lifelong educators and professors had three sections: respondent's profile and program management, suggestions, and future plans. To ensure the validity of the survey, questions were modified and supplemented after gathering opinions of experts in each field.

## Ⅲ.3 Survey and analysis

A survey was conducted on lifelong program managers, professors and learners to identify u-learning conditions in Korea's lifelong learning centers and to conduct a needs analysis. Collected data was analyzed with SPSS (17.0). The subjects of the survey were three groups (learners, lifelong educators, and professors) so different questionnaires for each group were designed. The questions were designed to identify u-learning-related characteristics for each group, however some of the questions overlapped. Hence, the learner questionnaire was examined first, and the overlapping questions in the lifelong educator and professor questionnaire were later addressed and analyzed in it.

Analysis models used were ANOVA and t-test, which conduct a frequency analysis and cross-sectional analysis, and examine differences in averages. For the questions allowing overlapping answers, a multiple response data analysis was conducted, and through the cross-sectional analysis difference in response with regard to background variables was compared. For statistical significance, the significance probability was set as 0.05. However, for the multiple response data analysis where the distribution of groups was difficult to define, the significance probability did not apply. A general trend could be interpreted, however, from the result of the cross-sectional analysis.

# Ⅳ Result analysis

## Ⅳ.1 Research subjects

The total number of the survey respondents was 298, among whom 80.9% were

learners. The numbers of lifelong educators and professors were 20 (6.7%) and 37 (12.4%), respectively. Although their numbers were quite small, their ratios showed great diversity in background. Still, the small sampling size made it difficult to secure accuracy in the statistical significance of the result or to generalize some of the responses, so analyses focused on the learners' result data.

**Table 3** Descriptive statistics of research subjects

(Unit: person, %)

| Division | | Group | | | |
|---|---|---|---|---|---|
| | | Learner | Lifelong educator | Professor | Total |
| Gender | Male | 95 (39.4) | 2 (10.0) | 11 (29.7) | 108 (36.2) |
| | Female | 146 (60.6) | 18 (90.0) | 26 (70.3) | 190 (63.8) |
| Age | Below 34 years | 87 (36.3) | 9 (45.0) | 19 (51.4) | 115 (38.7) |
| | 35~44 | 90 (37.5) | 11 (55.0) | 13 (35.1) | 114 (38.4) |
| | 45~54 | 41 (17.1) | 0 (0.0) | 4 (10.8) | 45 (15.2) |
| | Above 55 | 22 (9.2) | 0 (0.0) | 1 (2.7) | 23 (7.7) |
| Total | | 241 (100.0) | 20 (100.0) | 37 (100.0) | 298 (100.0) |

In terms of gender, 190 (63.8%) were women. The ratio was even higher among lifelong educators: (90% were women), with 70.3% of professors being women. In terms of age, learners who were under 34 years old and between 35 and 44 were 38.7% and 38.4% respectively, which comprised most of the respondents. Those 55 years old or older comprised only 7.7%. In groups, professor respondents who were 34 years old or less accounted for about half (51.4%), and together with the respondents who were between 35 and 44 years old (35.1%) accounted for 86.5%. Those under 45 represented the lion's share. For lifelong educators, all but one of the respondents was 44 years old or younger.

In order to show a detailed characteristic of learners who accounted for a large portion

of the total respondents, the following table with academic qualifications, occupational type, the size of company and average monthly income with a cross-sectional analysis is given. According to the statistical analysis, 48.7% of learners had bachelor degrees and 27.5% of them had master degrees or higher.

**Table 4** Descriptive statistics of learners

(Unit: person, %)

| Division | | Academic qualification | | | |
|---|---|---|---|---|---|
| | | High school diploma | Bachelor degree | Master degree and above | Total |
| Occupation | Administrative | 2 (12.5) | 9 (56.3) | 5 (31.3) | 16 (100.0) |
| | Professional | 4 (7.7) | 17 (32.7) | 31 (59.6) | 52 (100.0) |
| | Clerical | 11 (26.2) | 22 (52.4) | 9 (21.4) | 42 (100.0) |
| | Service · technical | 7 (29.2) | 15 (62.5) | 2 (8.3) | 24 (100.0) |
| | Student | 4 (23.5) | 9 (52.9) | 4 (23.5) | 17 (100.0) |
| | House wife | 22 (52.4) | 20 (47.6) | 0 (0.0) | 42 (100.0) |
| | Others | 1 (7.7) | 10 (76.9) | 2 (15.4) | 13 (100.0) |
| | Total | 51 (24.8) | 102 (49.5) | 53 (25.7) | 206 (100.0) |
| Size of company | Below 10 | 9 (23.1) | 27 (69.2) | 3 (7.7) | 39 (100.0) |
| | Between 11~49 | 8 (25.8) | 13 (41.9) | 10 (32.3) | 31 (100.0) |
| | Between 50~99 | 3 (15.0) | 11 (55.0) | 6 (30.0) | 20 (100.0) |
| | Between 100~999 | 4 (16.0) | 15 (60.0) | 6 (24.0) | 25 (100.0) |
| | 1,000 and more | 2 (4.9) | 12 (29.3) | 27 (65.9) | 41 (100.0) |
| | Total | 26 (16.7) | 78 (50.0) | 52 (33.3) | 156 (100.0) |

| | | | | | |
|---|---|---|---|---|---|
| Average monthly income | Below 2million won | 17 (32.7) | 28 (53.8) | 7 (13.5) | 52 (100.0) |
| | Between 2~4 million won | 19 (20.9) | 43 (47.3) | 29 (31.9) | 91 (100.0) |
| | 4million won and more | 10 (20.0) | 23 (46.0) | 17 (34.0) | 50 (100.0) |
| | Total | 46 (23.8) | 94 (48.7) | 53 (27.5) | 193 (100.0) |

In occupational types, 25.2% of the total learners were engaged in professional work, followed by 20.4% who were either clerks or housewives. About one-quarter of learners (26.3%) worked in companies with more than 1,000 employees. The percentage of respondents who worked in companies with less than 50 employees was 44.9%, which shows that the size of the learners' companies was very diverse. Lastly, in average monthly income, between 2 million and 4 million won was the highest with 47.2%, while those earning average monthly incomes below 2 million won and above 4 million won were both about 27%.

The lifelong educator and professors' distribution of background variables is as following (though there were far fewer respondents, their background variables were diverse).

**Table 5** Descriptive statistics of lifelong educators and professors

(Unit: Person, %)

| Division | | Group | | |
|---|---|---|---|---|
| | | Lifelong educator | Professor | Total |
| Years of work experience | 2 years (or 3 years) and below | 5 (25.0) | 15 (40.5) | 20 (35.1) |
| | 4 years (or 5 years) and below | 8 (40.0) | 10 (27.0) | 18 (31.6) |
| | 4years ( or 5years) and more | 7 (35.0) | 12 (32.4) | 19 (33.3) |
| | Total | 20 (100.0) | 37 (100.0) | 57 (100.0) |
| Type of lifelong | University-affiliated institutes | 4 (20.0) | . | 4 (20.0) |

| | | | | |
|---|---|---|---|---|
| learning institutes | Public and municipal centers | 16 (80.0) | . | 16 (80.0) |
| | Total | 20 (100.0) | . | 20 (100.0) |
| Professor's place of work | Korea National Open University | . | 6 (16.2) | 6 (16.2) |
| | Cyber universities | . | 11 (29.7) | 11 (29.7) |
| | Corporate educational institutes | . | 7 (18.9) | 7 (18.9) |
| | Others | . | 13 (35.1) | 13 (35.1) |
| | Total | . | 37 (100.0) | 37 (100.0) |

First of all, in the years of work experience for lifelong educators the ratio of 4 years or less, in other words the work experience for 2 or 3 years was the highest with 40.0%. In terms of work experience, 40% of lifelong educators had worked four years or less, while 35% had worked more than 4 years. The average work experience of professors was less than that of the lifelong educators: 40.5% of the professors had less than two years of work experience and the professors with more than two years of work experience accounted for 59.5%, compared to lifelong educators with 75%.

In terms of workplace, 16 lifelong educators, 80% of the total respondents, worked in public or municipal centers. The percentage of lifelong educators working in the university-affiliated institutes was only 20, while 45.9% of professors worked at universities.

The results for both groups showed a diversity of backgrounds.

## Ⅳ.2 Needs analysis and result data

Taking account of the characteristics of the above respondents, the result data of the needs analysis focused on the learners (who accounted for a majority of the

respondents), though when needed the result data of the lifelong educators and professors was compared.

The result data of the needs analysis in e-learning for lifelong learning in the ubiquitous environments is presented in three categories: 1) e-learning participation; 2) awareness and readiness for ubiquitous environments; and 3) needs of e-learning in the ubiquitous environment.

## 1) E-learning participation

### (1) E-learning experience

Not every learner is engaged in e-learning. Some learners may not have any experience of e-learning and others may have had the experience but not recently. The following table shows the extent of learners' learning experience before analyzing their e-learning participation.

**Table 6** E-learning experience (1)

(Unit: person, %)

| Division | | Recent experience (within the past year) | Experience (more than one year) | No experience | Total | (Significance, probability) |
|---|---|---|---|---|---|---|
| Gender | Male | 75 (78.9) | 14 (14.7) | 6 (6.3) | 95 (100.0) | 2.40 (.301) |
| | Female | 103 (70.5) | 33 (22.6) | 10 (6.8) | 146 (100.0) | |
| | Total | 178 (73.9) | 47 (19.5) | 16 (6.6) | 241 (100.0) | |
| Age | 34 years and younger | 63 (72.4) | 19 (21.8) | 5 (5.7) | 87 (100.0) | 2.35 (.885) |
| | 35~44 years | 65 (72.2) | 19 (21.1) | 6 (6.7) | 90 (100.0) | |
| | 45~54years | 31 (75.6) | 6 (14.6) | 4 (9.8) | 41 (100.0) | |
| | 55 years and older | 18 (81.8) | 3 (13.6) | 1 (4.5) | 22 (100.0) | |
| | Total | 177 (73.8) | 47 (19.6) | 16 (6.7) | 240 (100.0) | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Academic qualification | High school diploma | 41 (71.9) | 7 (12.3) | 9 (15.8) | 57 (100.0) | 13.18 (.010) |
| | Bachelor degree | 89 (72.4) | 30 (24.4) | 4 (3.3) | 123 (100.0) | |
| | Master degree or higher | 48 (78.7) | 10 (16.4) | 3 (4.9) | 61 (100.0) | |
| | Total | 178 (73.9) | 47 (19.5) | 16 (6.6) | 241 (100.0) | |

The overwhelming majority (93.4%) of learners had e-learning experience, 73.9% of them within the past year. There was not much difference in e-learning experience between genders. Depending on whether their e-learning experience was within the past one year, there is a difference of 8% between men and women. However, when looking solely at whether or not they had had e-learning experience, and the results for both men and women were similar. (Combined, only 6.6% of learners had not had e-learning experience.)

There were a few differences in age and academic qualifications. The experience ratio of e-learning among learners 55 years old and older was the highest, and the experience ratio of e-learning among the learners between 45 and 54 (where they reach the peak in social activity) was lowest. Furthermore, the higher the learner's academic qualification is, the higher the rate of e-learning participation is. Among the learners who only have high school diplomas, 15.8% of them did not have any experience of participating in e-learning, exceeding the average of 6.6%. The difference in academic qualification is shown to be meaningful according to the level of significance, which is .05.

**(2) Frequented e-learning educational websites**

E-learning educational websites most frequented were distance university websites (28.1%), such as Korea National Open University, and cyber universities, followed by distance academies with e-learning (14.8%). About one-tenth (11.7%) of the learners frequented the municipal institutes and affiliated educational centers.

In terms of gender, the ratio of women using the distance universities (32.4%) is much higher than that of men (20.7%). This ratio is also higher than the ratios of

men taking classes in the distance academies (16.6%) or taking online lectures from general universities (13.3%).

There seemed to be an age-related difference according to one's capacity to use the online environment. The learners who are 45 years or older often use the online educational programs and websites of the municipal institutes and affiliated educational centers, whereas the ratio of the learners who are 44 years or younger have higher usage of distance academies or the educational program of non-profit organizations. A similar trend is found in terms of academic qualification. The lower one's academic qualification is, the higher the rate of using the websites of distance universities, which can be deemed as the basic e-learning program. On the other hand, learners with higher academic qualifications are shown to use the distance academies and the websites of non-profit organizations apart from the programs offered by the distance universities.

In the field of occupations, there is no significant characteristic trend, but the ratio among those who work in the service industries and technical fields, or are housewives, using the programs offered by the distance universities was shown to be higher while the learners in administrative (17.9%) or clerical positions (17.9%) or that are professionals (16.7%) use the distance academies more.

In terms of average monthly income, the lower income is, the higher the rate of using websites of distance universities. There were no other significant differences.

**Table 7** Frequented e-learning educational websites (Overlapping response)

(Unit: Person, %)

| Division | | Public sector | Municipal/ affiliated educational institutes | Public educational welfare and cultural centers | Distance university | General university | Distance academy | Non-profit private institutes | Others | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| Gender | Male | 12 (8.3) | 15 (10.3) | 7 (4.8) | 30 (20.7) | 19 (13.1) | 24 (16.6) | 16 (11.0) | 22 (15.2) | 145 (100.0) |
| | Female | 21 (8.5) | 31 (12.6) | 22 (8.9) | 80 (32.4) | 24 (9.7) | 34 (13.8) | 24 (9.7) | 11 (4.5) | 247 (100.0) |
| | Total | 33 (8.4) | 46 (11.7) | 29 (7.4) | 110 (28.1) | 43 (11.0) | 58 (14.8) | 40 (10.2) | 33 (8.4) | 392 (100.0) |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Age | 34years or younger | 10 (7.9) | 9 (7.1) | 7 (5.6) | 22 (17.5) | 12 (9.5) | 29 (23.0) | 20 (15.9) | 17 (13.5) | 126 (100.0) |
| | 35~44years of age | 15 (9.6) | 19 (12.1) | 13 (8.3) | 44 (28.0) | 17 (10.8) | 24 (15.3) | 12 (7.6) | 13 (8.3) | 157 (100.0) |
| | 45~54 of age or younger | 6 (8.6) | 12 (17.1) | 5 (7.1) | 26 (37.1) | 10 (14.3) | 4 (5.7) | 6 (8.6) | 1 (1.4) | 70 (100.0) |
| | 55 years or older | 2 (5.3) | 6 (15.8) | 4 (10.5) | 18 (47.4) | 4 (10.5) | 1 (2.6) | 1 (2.6) | 2 (5.3) | 38 (100.0) |
| | Total | 33 (8.4) | 46 (11.8) | 29 (7.4) | 110 (28.1) | 43 (11.0) | 58 (14.8) | 39 (10.0) | 33 (8.4) | 391 (100.0) |
| Academic Qualification | High school diploma | 7 (7.2) | 14 (14.4) | 8 (8.2) | 34 (35.1) | 10 (10.3) | 7 (7.2) | 12 (12.4) | 5 (5.2) | 97 (100.0) |
| | Bachelor degree | 17 (8.7) | 23 (11.7) | 14 (7.1) | 61 (31.1) | 19 (9.7) | 36 (18.4) | 13 (6.6) | 13 (6.6) | 196 (100.0) |
| | Master degree or higher | 9 (9.1) | 9 (9.1) | 7 (7.1) | 15 (15.2) | 14 (14.1) | 15 (15.2) | 15 (15.2) | 15 (15.2) | 99 (100.0) |
| | Total | 33 (8.4) | 46 (11.7) | 29 (7.4) | 110 (28.1) | 43 (11.0) | 58 (14.8) | 40 (10.2) | 33 (8.4) | 392 (100.0) |
| Occupation | Administrative | 4 (14.3) | 3 (10.7) | 1 (3.6) | 6 (21.4) | 2 (7.1) | 5 (17.9) | 3 (10.7) | 4 (14.3) | 28 (100.0) |
| | Professional | 6 (8.3) | 5 (6.9) | 5 (6.9) | 17 (23.6) | 10 (13.9) | 12 (16.7) | 9 (12.5) | 8 (11.1) | 72 (100.0) |
| | Clerical | 9 (13.4) | 7 (10.4) | 6 (9.0) | 13 (19.4) | 5 (7.5) | 12 (17.9) | 7 (10.4) | 8 (11.9) | 67 (100.0) |
| | Service · Technical | 3 (7.9) | 5 (13.2) | 3 (7.9) | 15 (39.5) | 3 (7.9) | 4 (10.5) | 3 (7.9) | 2 (5.3) | 38 (100.0) |
| | Student | 0 (0.0) | 2 (6.9) | 4 (13.8) | 8 (27.6) | 5 (17.2) | 5 (17.2) | 3 (10.3) | 2 (6.9) | 29 (100.0) |
| | Housewife | 3 (4.3) | 10 (14.5) | 3 (4.3) | 27 (39.1) | 9 (13.0) | 7 (10.1) | 7 (10.1) | 3 (4.3) | 69 (100.0) |
| | Other | 1 (5.0) | 3 (15.0) | 1 (5.0) | 6 (30.0) | 2 (10.0) | 3 (15.0) | 2 (10.0) | 2 (10.0) | 20 (100.0) |
| | Total | 26 (8.0) | 35 (10.8) | 23 (7.1) | 92 (28.5) | 36 (11.1) | 48 (14.9) | 34 (10.5) | 29 (9.0) | 323 (100.0) |
| Size of company (By no. of employees) | Below 10 | 4 (7.4) | 5 (9.3) | 2 (3.7) | 20 (37.0) | 9 (16.7) | 6 (11.1) | 5 (9.3) | 3 (5.6) | 54 (100.0) |
| | Between 11~49 or less | 3 (6.0) | 5 (10.0) | 6 (12.0) | 11 (22.0) | 5 (10.0) | 9 (18.0) | 7 (14.0) | 4 (8.0) | 50 (100.0) |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Between 50~99 or less | 9 (21.4) | 5 (11.9) | 5 (11.9) | 8 (19.0) | 4 (9.5) | 4 (9.5) | 6 (14.3) | 1 (2.4) | 42 (100.0) |
| | Between 100~999s | 4 (10.0) | 5 (12.5) | 4 (10.0) | 10 (25.0) | 6 (15.0) | 7 (17.5) | 2 (5.0) | 2 (5.0) | 40 (100.0) |
| | More than 1,000 | 3 (5.3) | 2 (3.5) | 2 (3.5) | 9 (15.8) | 3 (5.3) | 13 (22.8) | 8 (14.0) | 17 (29.8) | 57 (100.0) |
| | Total | 23 (9.5) | 22 (9.1) | 19 (7.8) | 58 (23.9) | 27 (11.1) | 39 (16.0) | 28 (11.5) | 27 (11.1) | 243 (100.0) |
| Average monthly income | Below 2 million won | 8 (9.5) | 7 (8.3) | 7 (8.3) | 26 (31.0) | 11 (13.1) | 13 (15.5) | 8 (9.5) | 4 (4.8) | 84 (100.0) |
| | 2~4million s | 9 (6.7) | 14 (10.4) | 8 (5.9) | 40 (29.6) | 11 (8.1) | 25 (18.5) | 14 (10.4) | 14 (10.4) | 135 (100.0) |
| | More than 4 million won | 8 (9.2) | 10 (11.5) | 7 (8.0) | 21 (24.1) | 12 (13.8) | 8 (9.2) | 11 (12.6) | 10 (11.5) | 87 (100.0) |
| | Total | 25 (8.2) | 31 (10.1) | 22 (7.2) | 87 (28.4) | 34 (11.1) | 46 (15.0) | 33 (10.8) | 28 (9.2) | 306 (100.0) |

### (3) Places for e-learning

The following table is a brief summary of places where e-learning usually takes place. Most, 69.3%, engage in e-learning at home and only 19.7% reported engaging in e-learning at work.

**Table 8** Places for e-learning (1)

(Unit: Person, %)

| Division | | Relevant educational institutes | House | Workplace | Inside vehicles | Others | Total | (Significance probability) |
|---|---|---|---|---|---|---|---|---|
| Gender | Male | 5 (5.4) | 49 (53.3) | 29 (31.5) | 8 (8.7) | 1 (1.1) | 92 (100.0) | 19.25 (.001) |
| | Female | 4 (2.7) | 116 (79.5) | 18 (12.3) | 6 (4.1) | 2 (1.4) | 146 (100.0) | |
| | Total | 9 (3.8) | 165 (69.3) | 47 (19.7) | 14 (5.9) | 3 (1.3) | 238 (100.0) | |
| Age | 34 years or younger | 4 (4.8) | 49 (58.3) | 25 (29.8) | 5 (6.0) | 1 (1.2) | 84 (100.0) | 17.37 (.136) |
| | 35~44 years of age | 3 (3.3) | 65 (72.2) | 15 (16.7) | 7 (7.8) | 0 (0.0) | 90 (100.0) | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 45~54 years of age | 1 (2.4) | 32 (78.0) | 5 (12.2) | 2 (4.9) | 1 (2.4) | 41 (100.0) | |
| | 55 years or older | 1 (4.5) | 19 (86.4) | 1 (4.5) | 0 (0.0) | 1 (4.5) | 22 (100.0) | |
| | Total | 9 (3.8) | 165 (69.6) | 46 (19.4) | 14 (5.9) | 3 (1.3) | 237 (100.0) | |
| Academic qualification | High school diploma | 2 (3.5) | 45 (78.9) | 4 (7.0) | 5 (8.8) | 1 (1.8) | 57 (100.0) | 30.91 (.000) |
| | Bachelor degree | 5 (4.1) | 91 (75.2) | 17 (14.0) | 6 (5.0) | 2 (1.7) | 121 (100.0) | |
| | Master degree or higher | 2 (3.3) | 29 (48.3) | 26 (43.3) | 3 (5.0) | 0 (0.0) | 60 (100.0) | |
| | Total | 9 (3.8) | 165 (69.3) | 47 (19.7) | 14 (5.9) | 3 (1.3) | 238 (100.0) | |

In terms of gender, more women (79.5%) answered that they mostly engage in e-learning at home than men (53.3%), while more men (31.5%) engage in e-learning at work than women (12.3%). Considering that 33.9% of the women respondents are housewives, it is obvious that their place for learning is home. Given that 90% of the men respondents are office workers, it is understandable that the rate of men who engage in e-learning at work cannot help but be high. When looked at the data in terms of age, the most common place for e-learning for all age groups was home. Nevertheless, upon looking at the rate of those who answered that they mostly engaged in e-learning at work, its rate increased in the younger groups.

In terms of academic qualification, 80% of the learners with only high school diplomas or bachelor degrees answered they engaged in e-learning at home, whereas the rate of the learners with more than master degrees is only 48.3%. More than two-fifths (43.3%) of those with master degrees or higher engage in e-learning at work. This indicates that with higher academic qualifications, learners are highly likely to have more time and equipment for e-learning at their disposal at work.

The responses in regard to average monthly income are summarized in the table below.

**Table 9** Places for e-learning(2)

(Unit: person, %)

| Division | | Relevant educational institutes | House | Workplace | Inside vehicle | Others | Total | (Significance probability) |
|---|---|---|---|---|---|---|---|---|
| Occupation | Administrative | 0 (0.0) | 10 (62.5) | 6 (37.5) | 0 (0.0) | 0 (0.0) | 16 (100.0) | 57.70 (.000) |
| | Professional | 2 (4.0) | 26 (52.0) | 17 (34.0) | 5 (10.0) | 0 (0.0) | 50 (100.0) | |
| | Clerical | 2 (4.8) | 23 (54.8) | 16 (38.1) | 1 (2.4) | 0 (0.0) | 42 (100.0) | |
| | Service · Technical | 0 (0.0) | 18 (75.0) | 3 (12.5) | 3 (12.5) | 0 (0.0) | 24 (100.0) | |
| | Student | 1 (5.9) | 14 (82.4) | 0 (0.0) | 2 (11.8) | 0 (0.0) | 17 (100.0) | |
| | Housewife | 0 (0.0) | 40 (95.2) | 1 (2.4) | 0 (0.0) | 1 (2.4) | 42 (100.0) | |
| | Other | 2 (15.4) | 8 (61.5) | 2 (15.4) | 0 (0.0) | 1 (7.7) | 13 (100.0) | |
| | Total | 7 (3.4) | 139 (68.1) | 45 (22.1) | 11 (5.4) | 2 (1.0) | 204 (100.0) | |
| Average monthly income | Below 2 million won | 3 (5.8) | 39 (75.0) | 5 (9.6) | 5 (9.6) | 0 (0.0) | 52 (100.0) | 14.79 (.063) |
| | 2~4 million won | 1 (1.1) | 55 (61.1) | 27 (30.0) | 6 (6.7) | 1 (1.1) | 90 (100.0) | |
| | More than 4 million won | 2 (4.1) | 33 (67.3) | 13 (26.5) | 0 (0.0) | 1 (2.0) | 49 (100.0) | |
| | Total | 6 (3.1) | 127 (66.5) | 45 (23.6) | 11 (5.8) | 2 (1.0) | 191 (100.0) | |

The rate of the learners who have administrative, professional or clerical jobs engaging in e-learning at work was higher (37.5%, 34% and 38.1% respectively). Students or housewives (82.4% and 95.2% respectively) engage in e-learning at home, which is logical since in most cases they do not have jobs.

The rate of the learners with higher average monthly incomes engaging in e-learning at work was higher. This is not because of the effect of an income difference, but it is a difference that shows how one's age and occupation make their workplace

suitable for e-learning.

**(4) Primary e-learning tools**

E-learning tools, which the learners use primarily, were examined. The result was organized into the following table according to gender, age, and academic qualification. According to the data, 73.9% of the learners were taking e-learning classes on their personal computers. Only 19.7% were laptop users. What's more, only 2.5% of the learners used smart phones, which have been reported to be very popular recently, for e-learning.

**Table 10** Primary e-learning tools (1)

(Unit: Person, %)

| Division | | Personal PC | Laptop | Smart phone | Others | Total | (Significance probability) |
|---|---|---|---|---|---|---|---|
| Gender | Male | 66 (71.7) | 20 (21.7) | 6 (6.5) | 0 (0.0) | 92 (100.0) | 15.59 (.001) |
| | Female | 110 (75.3) | 27 (18.5) | 0 (0.0) | 9 (6.2) | 146 (100.0) | |
| | Total | 176 (73.9) | 47 (19.7) | 6 (2.5) | 9 (3.8) | 238 (100.0) | |
| Age | 34 years or younger | 57 (67.1) | 22 (25.9) | 2 (2.4) | 4 (4.7) | 85 (100.0) | 7.02 (.635) |
| | 35~44 years of age | 68 (75.6) | 17 (18.9) | 3 (3.3) | 2 (2.2) | 90 (100.0) | |
| | Between 45~54 | 32 (80.0) | 5 (12.5) | 1 (2.5) | 2 (5.0) | 40 (100.0) | |
| | 55 years or older | 19 (86.4) | 2 (9.1) | 0 (0.0) | 1 (4.5) | 22 (100.0) | |
| | Total | 176 (74.3) | 46 (19.4) | 6 (2.5) | 9 (3.8) | 237 (100.0) | |
| Academic qualification | High school diploma | 43 (76.8) | 9 (16.1) | 2 (3.6) | 2 (3.6) | 56 (100.0) | 3.77 (.708) |
| | Bachelor degree | 91 (74.6) | 22 (18.0) | 3 (2.5) | 6 (4.9) | 122 (100.0) | |
| | Master degree or higher | 42 (70.0) | 16 (26.7) | 1 (1.7) | 1 (1.7) | 60 (100.0) | |
| | Total | 176 (73.9) | 47 (19.7) | 6 (2.5) | 9 (3.8) | 238 (100.0) | |

When examined it in terms of gender, there seems to be a statistically significant difference of .05 in the cross-analysis, however in reality, the difference is not so big. None of the 146 female learners used smart phones for e-learning, whereas 6 (6.5%) male learners used smart phones for e-learning. This may demonstrate that male learners may have adjusted to the use of smart phones, a relatively new device and learning method. In the event of the expansion of mobile learning with smart phones, efforts should be made to encourage them among female learners.

The type of computer a learner uses changes dramatically with regard to age. For More than 80% of older people use personal computers, while young and middle-aged people are more likely to use laptops (25.9% and 18.9% respectively). This shows that younger learners engage in e-learning activities even when they are on the go. There is a similar trend aligned with academic qualifications. Of those who have not studied past high school , 76.8%, compared with 70% among those with master's degrees or higher. Learners with higher academics are also more likely to use laptops (26.7%).The following table shows learners' occupations and average monthly income.

**Table 11** Main e-learning tools (2)

(Unit: Person, %)

| Division | | Personal PC | Laptop | Smart phone | Others | Total | (Significance Probability) |
|---|---|---|---|---|---|---|---|
| Occupation | Administrative | 14 (87.5) | 2 (12.5) | 0 (0.0) | 0 (0.0) | 16 (100.0) | 17.29 (.503) |
| | Professional | 37 (72.5) | 10 (19.6) | 3 (5.9) | 1 (2.0) | 51 (100.0) | |
| | Clerical | 33 (78.6) | 8 (19.0) | 0 (0.0) | 1 (2.4) | 42 (100.0) | |
| | Service · Technical | 14 (58.3) | 7 (29.2) | 1 (4.2) | 2 (8.3) | 24 (100.0) | |
| | Student | 9 (52.9) | 6 (35.3) | 1 (5.9) | 1 (5.9) | 17 (100.0) | |
| | Housewife | 35 (83.3) | 6 (14.3) | 0 (0.0) | 1 (2.4) | 42 (100.0) | |
| | Other | 10 (76.9) | 3 (23.1) | 0 (0.0) | 0 (0.0) | 13 (100.0) | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Total | 152 (74.1) | 42 (20.5) | 5 (2.4) | 6 (2.9) | 205 (100.0) | |
| Average monthly income | Less than 2 million won | 38 (73.1) | 9 (17.3) | 1 (1.9) | 4 (7.7) | 52 (100.0) | 8.59 (.198) |
| | Between 2~4 million won | 68 (75.6) | 17 (18.9) | 4 (4.4) | 1 (1.1) | 90 (100.0) | |
| | More than 4 million won | 36 (72.0) | 13 (26.0) | 0 (0.0) | 1 (2.0) | 50 (100.0) | |
| | Total | 142 (74.0) | 39 (20.3) | 5 (2.6) | 6 (3.1) | 192 (100.0) | |

A surprisingly high percentage of learners in administrative, professional and clerical positions use personal computers (72.5%~87.5%), while those in service and technical jobs reported the highest use of laptops. Students and those who work in services or technical fields use laptops relatively more frequently since they do not have their own office or are often on the move.

A correlation between income and PC use was also found: as income rises use of PCs declines and usage of laptops increases slightly. It appears that learners' learning is greatly affected by their occupation and academic qualifications and that the high price of laptops has an effect.

In summary, more than 90% of respondents had had an e-learning experience. Most are engaged in e-learning through websites or distance or cyber universities through their personal computers at home. The higher one's academic qualification is, the higher the rate of e-learning participation is. Moreover, young learners engage in e-learning activities even while on the move.

### 2) Awareness of and preparedness for the ubiquitous environment

In order to identify awareness and preparedness for the ubiquitous environment, those surveyed were asked about: (1) e-learning devices they currently use (2) e-learning devices they will purchase within a year (3) the degree to which they are familiar with the Internet and electronic devices, (4) the extent to which they use electronic devices for time and resource management.

**(1) E-learning devices that they currently use**

Learners were told to mark all the devices that they currently have, and a multiple response analysis was conducted to compare different responses from background variables. The most common devices were desktop computers (21.5%), followed by laptops (18.8%), MP3 players (17.0%), and mobile phones (16.6%).

In terms of gender, slightly more women had desktop computers (23.8%), mobile phones (20.9%) and mp3 players (19.2%) than men. Far more men, however, had smart phones than women. While women owned more conventional e-learning devices, men were more likely to own e-learning-related devices such as iPods, Tablets, smart pads and e-books than women.

No great difference in terms of age was found between the use of desktop computers and the use of laptops. However, smart phone use was higher among those 34 years of age or younger, while older respondents were more likely to use conventional phones.

**Table 12** E-learning devices that learners currently have (overlapping responses) (1)

(Unit: person, %)

| Division | | Desktop computer | Laptop | Mobile phone | Smart-phone | MP3 player | iPod | Tablet PC | PDA | PMP | Smart pad | E-Book reader | Others | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gender | Male | 79 (18.7) | 76 (18.0) | 47 (11.1) | 60 (14.2) | 60 (14.2) | 21 (5.0) | 16 (3.8) | 10 (2.4) | 19 (4.5) | 19 (4.5) | 14 (3.3) | 1 (.2) | 422 (100.0) |
| | Female | 125 (23.8) | 102 (19.4) | 110 (20.9) | 34 (6.5) | 101 (19.2) | 13 (2.5) | 7 (1.3) | 4 (.8) | 20 (3.8) | 6 (1.1) | 3 (.6) | 1 (.2) | 526 (100.0) |
| | Total | 204 (21.5) | 178 (18.8) | 157 (16.6) | 94 (9.9) | 161 (17.0) | 34 (3.6) | 23 (2.4) | 14 (1.5) | 39 (4.1) | 25 (2.6) | 17 (1.8) | 2 (0.2) | 948 (100.0) |
| Age | 34 years or younger | 66 (18.0) | 68 (18.6) | 48 (13.1) | 47 (12.8) | 65 (17.8) | 17 (4.6) | 15 (4.1) | 2 (.5) | 15 (4.1) | 15 (4.1) | 8 (2.2) | 0 (0.0) | 366 (100.0) |
| | Between 35~44 | 81 (23.0) | 69 (19.6) | 63 (17.9) | 29 (8.2) | 59 (16.8) | 10 (2.8) | 4 (1.1) | 5 (1.4) | 15 (4.3) | 9 (2.6) | 7 (2.0) | 1 (.3) | 352 (100.0) |
| | Between 45~54 | 37 (24.7) | 26 (17.3) | 29 (19.3) | 11 (7.3) | 24 (16.0) | 6 (4.0) | 3 (2.0) | 4 (2.7) | 7 (4.7) | 1 (.7) | 1 (.7) | 1 (.7) | 150 (100.0) |
| | 55 years or older | 19 (24.7) | 14 (18.2) | 17 (22.1) | 6 (7.8) | 13 (16.9) | 1 (1.3) | 1 (1.3) | 3 (3.9) | 2 (2.6) | 0 (0.0) | 1 (1.3) | 0 (0.0) | 77 (100.0) |
| | Total | 203 (21.5) | 177 (18.7) | 157 (16.6) | 93 (9.8) | 161 (17.0) | 34 (3.6) | 23 (2.4) | 14 (1.5) | 39 (4.1) | 25 (2.6) | 17 (1.8) | 2 (0.2) | 945 (100.0) |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Academic qual-ification | High school diploma | 48 (24.9) | 31 (16.1) | 40 (20.7) | 14 (7.3) | 33 (17.1) | 2 (1.0) | 1 (.5) | 5 (2.6) | 13 (6.7) | 3 (1.6) | 3 (1.6) | 0 (0.0) | 193 (100.0) |
| | Bachelor's degree | 105 (22.8) | 89 (19.3) | 88 (19.1) | 36 (7.8) | 85 (18.5) | 16 (3.5) | 7 (1.5) | 5 (1.1) | 18 (3.9) | 7 (1.5) | 3 (.7) | 1 (.2) | 460 (100.0) |
| | Master's degree or higher | 51 (17.3) | 58 (19.7) | 29 (9.8) | 44 (14.9) | 43 (14.6) | 16 (5.4) | 15 (5.1) | 4 (1.4) | 8 (2.7) | 15 (5.1) | 11 (3.7) | 1 (.3) | 295 (100.0) |
| | Total | 204 (21.5) | 178 (18.8) | 157 (16.6) | 94 (9.9) | 161 (17.0) | 34 (3.6) | 23 (2.4) | 14 (1.5) | 39 (4.1) | 25 (2.6) | 17 (1.8) | 2 (0.2) | 948 (100.0) |

The following table is the response result based on average monthly income. There seems to be differences across different occupations. There was little difference between housewives and learners of other occupation groups when it came to commonly used devices, such as PCs, laptops, mobile phones, and MP3 players. However, with regard to state-of-the art devices such as smart phones, iPods, tablet PCs, and smart pads, few housewives used any.

Results based on average monthly income seem to reflect the financial burden of the price of devices used for e-learning. There was no difference across the different income groups for commonly used devices, but the rate of ownership for high-end devices correlated with rising income.

**Table 13** E-learning devices that learners currently have (overlapping responses) (2)

(Unit: person, %)

| Division | | Desktop computer | Laptop | Mobile phone | Smart phone | MP3 player | iPod | Tablet PC | PDA | PMP | Smart pad | E-Book reader | Others | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Occup-ation | Admini-strative | 14 (20.9) | 13 (19.4) | 12 (17.9) | 6 (9.0) | 11 (16.4) | 2 (3.0) | 1 (1.5) | 1 (1.5) | 2 (3.0) | 3 (4.5) | 2 (3.0) | 0 (0.0) | 67 (100.0) |
| | Professional | 48 (20.5) | 47 (20.1) | 26 (11.1) | 32 (13.7) | 32 (13.7) | 13 (5.6) | 6 (2.6) | 5 (2.1) | 7 (3.0) | 12 (5.1) | 6 (2.6) | 0 (0.0) | 234 (100.0) |
| | Clerical | 36 (20.3) | 29 (16.4) | 28 (15.8) | 16 (9.0) | 32 (18.1) | 6 (3.4) | 9 (5.1) | 3 (1.7) | 11 (6.2) | 4 (2.3) | 3 (1.7) | 0 (0.0) | 177 (100.0) |
| | Service · Technical | 19 (23.2) | 15 (18.3) | 13 (15.9) | 10 (12.2) | 13 (15.9) | 1 (1.2) | 2 (2.4) | 2 (2.4) | 4 (4.9) | 0 (0.0) | 3 (3.7) | 0 (0.0) | 82 (100.0) |
| | Student | 13 (20.0) | 12 (18.5) | 13 (20.0) | 6 (9.2) | 12 (18.5) | 2 (3.1) | 1 (1.5) | 0 (0.0) | 5 (7.7) | 1 (1.5) | 0 (0.0) | 0 (0.0) | 65 (100.0) |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Housewife | 36 (26.3) | 27 (19.7) | 34 (24.8) | 5 (3.6) | 27 (19.7) | 2 (1.5) | 0 (0.0) | 0 (0.0) | 5 (3.6) | 1 (.7) | 0 (0.0) | 0 (0.0) | 137 (100.0) |
| | Other | 10 (20.0) | 7 (14.0) | 8 (16.0) | 5 (10.0) | 7 (14.0) | 5 (10.0) | 4 (8.0) | 2 (4.0) | 0 (0.0) | 1 (2.0) | 1 (2.0) | 0 (0.0) | 50 (100.0) |
| | Total | 176 (21.7) | 150 (18.5) | 134 (16.5) | 80 (9.9) | 134 (16.5) | 31 (3.8) | 23 (2.8) | 13 (1.6) | 34 (4.2) | 22 (2.7) | 15 (1.8) | 0 (0.0) | 812 (100.0) |
| Average monthly income | Less than 2 million won | 43 (22.8) | 37 (19.6) | 36 (19.0) | 16 (8.5) | 37 (19.6) | 3 (1.6) | 1 (.5) | 3 (1.6) | 7 (3.7) | 2 (1.1) | 4 (2.1) | 0 (0.0) | 189 (100.0) |
| | Between 2~4 million won | 78 (21.1) | 69 (18.6) | 56 (15.1) | 38 (10.3) | 58 (15.7) | 17 (4.6) | 11 (3.0) | 4 (1.1) | 17 (4.6) | 15 (4.1) | 7 (1.9) | 0 (0.0) | 370 (100.0) |
| | More than 4 million won | 44 (20.7) | 38 (17.8) | 31 (14.6) | 25 (11.7) | 32 (15.0) | 10 (4.7) | 10 (4.7) | 6 (2.8) | 8 (3.8) | 5 (2.3) | 4 (1.9) | 0 (0.0) | 213 (100.0) |
| | Total | 165 (21.4) | 144 (18.7) | 123 (15.9) | 79 (10.2) | 127 (16.5) | 30 (3.9) | 22 (2.8) | 13 (1.7) | 32 (4.1) | 22 (2.8) | 15 (1.9) | 0 (0.0) | 772 (100.0) |

**(2) E-learning devices learners will purchase within one year**

Learners were told to check all devices that they plan to purchase, and a multiple response analysis was conducted to compare different responses from background variables. A largest number of learners (30.7%) answered that they intended to purchase smart phones, followed by smart pads (14.0%) or e-book readers (14.0%). Plans to purchase devices that have been launched quite recently, may show that commonly used devices lay the groundwork for a shift from the e-learning era to the mobile learning era.

In terms of gender, women exhibited a trend towards buying laptops (10.8%), smart phones (36.5%) or e-book devices that was higher than men, while men have more demand for e-learning devices that have been launched recently, such as tablet PCs (15.0%) and smart pads (27.5%). Comparing this data with the devices that the learners currently possess, it appears that female learners are one step behind male learners when it comes to buying and using the state-of-the-art devices.

In terms of age, those 55 or older showed a similar trend to those 34 years or younger towards buying state-of-the-art devices such as tablet PCs, smart pads, e-book devices. Across academic qualifications, there were many learners with only high school diplomas that wanted to buy laptops (21.7%), smart phones (26.1%) or e-book devices (21.7%), whereas those with master's degrees or higher constitute 75% of the learners that wanted to buy smart phones (25.0%), tablet PCs (15.0%) or smart pads (35.0%).

**Table 14** E-learning devices that the learners will purchase within one year (Overlapping response) (1)

(Unit: person, %)

| Division | | Desktop computer | Laptop | Mobile phone | Smart-phone | MP3 player | iPod | Tablet PC | PDA | PMP | Smart pad | E-Book Reader | Others | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gender | Male | 1 (2.5) | 3 (7.5) | 1 (2.5) | 8 (20.0) | 1 (2.5) | 1 (2.5) | 6 (15.0) | 1 (2.5) | 3 (7.5) | 11 (27.5) | 4 (10.0) | 0 (0.0) | 40 (100.0) |
| | Female | 3 (4.1) | 8 (10.8) | 0 (0.0) | 27 (36.5) | 0 (0.0) | 5 (6.8) | 8 (10.8) | 1 (1.4) | 4 (5.4) | 5 (6.8) | 12 (16.2) | 1 (1.4) | 74 (100.0) |
| | Total | 4 (3.5) | 11 (9.6) | 1 (0.9) | 35 (30.7) | 1 (0.9) | 6 (5.3) | 14 (12.3) | 2 (1.8) | 7 (6.1) | 16 (14.0) | 16 (14.0) | 1 (0.9) | 114 (100.0) |
| Age | 34 years or younger | 3 (6.7) | 4 (8.9) | 0 (0.0) | 13 (28.9) | 0 (0.0) | 1 (2.2) | 5 (11.1) | 1 (2.2) | 2 (4.4) | 8 (17.8) | 7 (15.6) | 1 (2.2) | 45 (100.0) |
| | Between 35~44 | 0 (0.0) | 4 (9.8) | 0 (0.0) | 13 (31.7) | 0 (0.0) | 4 (9.8) | 6 (14.6) | 0 (0.0) | 2 (4.9) | 7 (17.1) | 5 (12.2) | 0 (0.0) | 41 (100.0) |
| | Between 45~54 | 1 (6.3) | 1 (6.3) | 1 (6.3) | 7 (43.8) | 1 (6.3) | 1 (6.3) | 1 (6.3) | 1 (6.3) | 1 (6.3) | 0 (0.0) | 1 (6.3) | 0 (0.0) | 16 (100.0) |
| | 55 years or older | 0 (0.0) | 2 (16.7) | 0 (0.0) | 2 (16.7) | 0 (0.0) | 0 (0.0) | 2 (16.7) | 0 (0.0) | 2 (16.7) | 1 (8.3) | 3 (25.0) | 0 (0.0) | 12 (100.0) |
| | Total | 4 (3.5) | 11 (9.6) | 1 (0.9) | 35 (30.7) | 1 (0.9) | 6 (5.3) | 14 (12.3) | 2 (1.8) | 7 (6.1) | 16 (14.0) | 16 (14.0) | 1 (0.9) | 114 (100.0) |
| Academic qualifi-cation | High school diploma | 1 (4.3) | 5 (21.7) | 0 (0.0) | 6 (26.1) | 0 (0.0) | 1 (4.3) | 1 (4.3) | 0 (0.0) | 1 (4.3) | 3 (13.0) | 5 (21.7) | 0 (0.0) | 23 (100.0) |
| | Bachelor's degree | 2 (2.8) | 6 (8.5) | 1 (1.4) | 24 (33.8) | 1 (1.4) | 3 (4.2) | 10 (14.1) | 2 (2.8) | 5 (7.0) | 6 (8.5) | 10 (14.1) | 1 (1.4) | 71 (100.0) |
| | Master's degree or higher | 1 (5.0) | 0 (0.0) | 0 (0.0) | 5 (25.0) | 0 (0.0) | 2 (10.0) | 3 (15.0) | 0 (0.0) | 1 (5.0) | 7 (35.0) | 1 (5.0) | 0 (0.0) | 20 (100.0) |
| | Total | 4 (3.5) | 11 (9.6) | 1 (0.9) | 35 (30.7) | 1 (0.9) | 6 (5.3) | 14 (12.3) | 2 (1.8) | 7 (6.1) | 16 (14.0) | 16 (14.0) | 1 (0.9) | 114 (100.0) |

The following table is the response result based on the average monthly income. As can be seen from the table, it is difficult to grasp the trend across occupations due to the lack of respondents. Therefore, the trend analysis of the occupation groups has been left out.

Furthermore, there is quite a lack of respondents in the average monthly income field. Nonetheless, there is one interesting point. If the income is low, the desire

to buy a smart phone is higher while the desire to buy a smart pad gets lower. This makes quite a contrast. Although the numbers of users are increasing for both devices, it costs more to buy smart pads. So just by looking at the data result, learners make a rational choice between smart phones and smart pads while taking their incomes into consideration.

**Table 15** E-learning devices that the learners will purchase within a year (Overlapping response) (2)

(Unit: person, %)

| Division | | Desktop computer | Laptop | Mobile phone | Smart-phone | MP3 player | iPod | Tablet PC | PDA | PMP | Smart pad | E-Book Reader | Others | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Occup-ation | Admini-strative | 0 (0.0) | 0 (0.0) | 0 (0.0) | 2 (28.6) | 0 (0.0) | 0 (0.0) | 1 (14.3) | 0 (0.0) | 1 (14.3) | 2 (28.6) | 1 (14.3) | 0 (0.0) | 7 (100.0) |
| | Professional | 1 (7.1) | 0 (0.0) | 0 (0.0) | 4 (28.6) | 0 (0.0) | 2 (14.3) | 2 (14.3) | 0 (0.0) | 0 (0.0) | 4 (28.6) | 1 (7.1) | 0 (0.0) | 14 (100.0) |
| | Clerical | 2 (7.7) | 3 (11.5) | 0 (0.0) | 9 (34.6) | 0 (0.0) | 0 (0.0) | 3 (11.5) | 0 (0.0) | 0 (0.0) | 3 (11.5) | 6 (23.1) | 0 (0.0) | 26 (100.0) |
| | Service · Technical | 0 (0.0) | 0 (0.0) | 0 (0.0) | 3 (75.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 1 (25.0) | 0 (0.0) | 0 (0.0) | 4 (100.0) |
| | Student | 0 (0.0) | 1 (6.3) | 0 (0.0) | 3 (18.8) | 0 (0.0) | 0 (0.0) | 1 (6.3) | 1 (6.3) | 2 (12.5) | 4 (25.0) | 3 (18.8) | 1 (6.3) | 16 (100.0) |
| | Housewife | 0 (0.0) | 3 (21.4) | 0 (0.0) | 7 (50.0) | 0 (0.0) | 2 (14.3) | 0 (0.0) | 0 (0.0) | 1 (7.1) | 0 (0.0) | 1 (7.1) | 0 (0.0) | 14 (100.0) |
| | Other | 0 (0.0) | 2 (66.7) | 0 (0.0) | 1 (33.3) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 3 (100.0) |
| | Total | 3 (3.6) | 9 (10.7) | 0 (0.0) | 29 (34.5) | 0 (0.0) | 4 (4.8) | 7 (8.3) | 1 (1.2) | 4 (4.8) | 14 (16.7) | 12 (14.3) | 1 (1.2) | 84 (100.0) |
| Average monthly income | Less than 2 million won | 2 (8.3) | 1 (4.2) | 0 (0.0) | 10 (41.7) | 0 (0.0) | 1 (4.2) | 1 (4.2) | 0 (0.0) | 1 (4.2) | 4 (16.7) | 4 (16.7) | 0 (0.0) | 24 (100.0) |
| | Between 2~4 million won | 1 (2.9) | 5 (14.7) | 0 (0.0) | 11 (32.4) | 0 (0.0) | 1 (2.9) | 5 (14.7) | 0 (0.0) | 0 (0.0) | 6 (17.6) | 5 (14.7) | 0 (0.0) | 34 (100.0) |
| | More than 4 million won | 0 (0.0) | 1 (6.7) | 0 (0.0) | 5 (33.3) | 0 (0.0) | 1 (6.7) | 1 (6.7) | 0 (0.0) | 2 (13.3) | 3 (20.0) | 2 (13.3) | 0 (0.0) | 15 (100.0) |
| | Total | 3 (4.1) | 7 (9.6) | 0 (0.0) | 26 (35.6) | 0 (0.0) | 3 (4.1) | 7 (9.6) | 0 (0.0) | 3 (4.1) | 13 (17.8) | 11 (15.1) | 0 (0.0) | 73 (100.0) |

**(3) Level of familiarity with electronic networks and devices, such as the Internet and mobile phones**

The learners' level of familiarity with electronic networks and devices needed for e-learning, such as the Internet, mobile phones and laptops has been examined. Their level of familiarity was measured on a five point Likert scale (1 for not familiar at all and 5 for quite familiar) and their averages were calculated to analyze differences in background variables. According to the data result, 75% of the learners answered that they were familiar with the electronic networks and devices such as the Internet, mobile phones and laptops. The average was 4.02, showing relatively a high level of familiarity.

In terms of gender, the rate of learners quite familiar with the devices was high in men (42.1%) while the rate of the learners with average familiarity was high in women (28.1%). However, there was no great difference between men (4.3%) and women (6.2%) in the rates of learners who thought negatively of their familiarity with the electronic devices. Men and women showed a high level of familiarity: 4.18 for men and 3.92 for women although the difference in the level of familiarity across gender was significant statically, in reality, it is not.

There was a significant difference across the age groups. In general, as the learner's age increases, the learners responded that they were less familiar with the devices, and the rate of the learners who were quite familiar with the devices decreased dramatically. Upon examining their real familiarity on the scale, learners 34 years or younger rated 4.32, while learners who 55 years or older was 3.50. The age, which demarcates this difference, is about 45. A correlation was also found in terms of academic qualifications, with higher academic qualifications corresponding to a higher level of familiarity with electronic devices. Among learners with master's degrees or higher, no one was unfamiliar with the devices. From the result of an average analysis, the familiarity level of the learners that have only high school diplomas was only 3.63 but the familiarity level of those with bachelor's degrees or higher exceeds 4.

**Table 16** Level of familiarity with electronic networks and devices (1)

(Unit: Person, %)

| Division | | Not familiar at all | Unfa-miliar | Average | Familiar | Quite familiar | Total | Average (Standard deviation) | F(t) Value (Significance probability) |
|---|---|---|---|---|---|---|---|---|---|
| Gender | Male | 1 (1.1) | 3 (3.2) | 14 (14.7) | 37 (38.9) | 40 (42.1) | 95 (100.0) | 4.18 (0.87) | 2.16 (.032) |
| | Female | 2 (1.4) | 7 (4.8) | 32 (21.9) | 64 (43.8) | 41 (28.1) | 146 (100.0) | 3.92 (0.90) | |
| | Total | 3 (1.2) | 10 (4.1) | 46 (19.1) | 101 (41.9) | 81 (33.6) | 241 (100.0) | 4.02 (0.90) | |
| Age | 34 years or younger | 2 (2.3) | 0 (0.0) | 8 (9.2) | 35 (40.2) | 42 (48.3) | 87 (100.0) | 4.32 (0.83) | 9.52 (.000) a > c, d |
| | Between 35~44 | 0 (0.0) | 4 (4.4) | 17 (18.9) | 40 (44.4) | 29 (32.2) | 90 (100.0) | 4.04 (0.83) | |
| | Between 45~54 | 1 (2.4) | 2 (4.9) | 15 (36.6) | 17 (41.5) | 6 (14.6) | 41 (100.0) | 3.61 (0.89) | |
| | 55 years or older | 0 (0.0) | 4 (18.2) | 6 (27.3) | 9 (40.9) | 3 (13.6) | 22 (100.0) | 3.50 (0.96) | |
| | Total | 3 (1.3) | 10 (4.2) | 46 (19.2) | 101 (42.1) | 80 (33.3) | 240 (100.0) | 4.02 (0.90) | |
| Academic qualification | High school diploma | 1 (1.8) | 5 (8.8) | 15 (26.3) | 29 (50.9) | 7 (12.3) | 57 (100.0) | 3.63 (0.88) | 9.65 (.000) a < b, c |
| | Bachelor's degree | 2 (1.6) | 5 (4.1) | 22 (17.9) | 49 (39.8) | 45 (36.6) | 123 (100.0) | 4.06 (0.93) | |
| | Master's degree or higher | 0 (0.0) | 0 (0.0) | 9 (14.8) | 23 (37.7) | 29 (47.5) | 61 (100.0) | 4.33 (0.72) | |
| | Total | 3 (1.2) | 10 (4.1) | 46 (19.1) | 101 (41.9) | 81 (33.6) | 241 (100.0) | 4.02 (0.90) | |

However, there is little distinct difference or trend across occupation groups. However, the level of familiarity of housewives (3.69) or those in technical fields (3.71) was relatively very low when compared with professionals (4.33). Average monthly income did not significantly affect level of familiarity with electronic devices significantly. Those earning less than 2 million won had the average score of 4.15, while earning more than 4 million won scored 4.04.

**Table 17** Level of familiarity with electronic networks and devices (2)

(Unit: Person, %)

| Division | | Not familiar at all | Unfamiliar | Average | familiar | Quite familiar | Total | Average (Standard deviation) | F(t) Value (Significance probability) |
|---|---|---|---|---|---|---|---|---|---|
| Occupation | Administrative | 0 (0.0) | 0 (0.0) | 2 (12.5) | 10 (62.5) | 4 (25.0) | 16 (100.0) | 4.13 (0.62) | 3.43 (.003) b>f |
| | Professional | 0 (0.0) | 0 (0.0) | 8 (15.4) | 19 (36.5) | 25 (48.1) | 52 (100.0) | 4.33 (0.73) | |
| | Clerical | 0 (0.0) | 1 (2.4) | 4 (9.5) | 21 (50.0) | 16 (38.1) | 42 (100.0) | 4.24 (0.73) | |
| | Service · Technical | 0 (0.0) | 3 (12.5) | 7 (29.2) | 8 (33.3) | 6 (25.0) | 24 (100.0) | 3.71 (1.00) | |
| | Student | 0 (0.0) | 1 (5.9) | 2 (11.8) | 9 (52.9) | 5 (29.4) | 17 (100.0) | 4.06 (0.83) | |
| | Housewife | 0 (0.0) | 3 (7.1) | 15 (35.7) | 16 (38.1) | 8 (19.0) | 42 (100.0) | 3.69 (0.87) | |
| | Other | 0 (0.0) | 1 (7.7) | 4 (30.8) | 2 (15.4) | 6 (46.2) | 13 (100.0) | 4.00 (1.08) | |
| | Total | 0 (0.0) | 9 (4.4) | 42 (20.4) | 85 (41.3) | 70 (34.0) | 206 (100.0) | 4.05 (0.85) | |
| Average monthly income | Less than 2 million won | 0 (0.0) | 4 (7.7) | 9 (17.3) | 14 (26.9) | 25 (48.1) | 52 (100.0) | 4.15 (0.98) | 0.35 (.703) |
| | Between 2~4 million won | 0 (0.0) | 4 (4.4) | 16 (17.6) | 44 (48.4) | 27 (29.7) | 91 (100.0) | 4.03 (0.81) | |
| | More than 4 million won | 0 (0.0) | 1 (2.0) | 14 (28.0) | 17 (34.0) | 18 (36.0) | 50 (100.0) | 4.04 (0.86) | |
| | Total | 0 (0.0) | 9 (4.7) | 39 (20.2) | 75 (38.9) | 70 (36.3) | 193 (100.0) | 4.07 (0.87) | |

**(4) The extent to which learners use electronic devices for time and resource management**

Learners were asked the extent to which they use electronic devices for time or resource management, and the responses measured on a five point Likert scale. According to the result data, 63.6% used electronic devices for time and resource management, while 13.8% did not. Men (3.72) used the devices a little more than women (3.65), but the difference was statistically insignificant.

The situation was different in terms of age. Those 34 years or younger averaged a score of 3.86 and those 55 years or older averaged only 3.27. Though all age groups had a scores above average (more than 3), the extent to which learners use electronic devices rises with decreasing learner age. Across academic qualifications, the extent to which learners use electronic devices increases with academic qualifications, and there is a clear distinction between those with high school diplomas and those with degrees.

**Table 18** Extent to which learners use electronic devices for time and resource management

(Unit: Person, %)

| Division | | Never use | Do not use | Average | Occasionally | Often use | Total | Average (Standard deviation) | F(t) Value (Significance probability) |
|---|---|---|---|---|---|---|---|---|---|
| Gender | Male | 2 (2.2) | 8 (8.6) | 21 (22.6) | 45 (48.4) | 17 (18.3) | 93 (100.0) | 3.72 (0.937) | 0.88 (.379) |
| | Female | 6 (4.1) | 17 (11.6) | 33 (22.6) | 63 (43.2) | 27 (18.5) | 146 (100.0) | 3.60 (1.047) | |
| | Total | 8 (3.3) | 25 (10.5) | 54 (22.6) | 108 (45.2) | 44 (18.4) | 239 (100.0) | 3.65 (1.005) | |
| Age | 34 years or younger | 3 (3.5) | 8 (9.4) | 12 (14.1) | 37 (43.5) | 25 (29.4) | 85 (100.0) | 3.86 (1.060) | 3.10 (.027) |
| | Between 35~44 | 2 (2.2) | 9 (10.0) | 22 (24.4) | 44 (48.9) | 13 (14.4) | 90 (100.0) | 3.63 (0.930) | |
| | Between 45~54 | 1 (2.4) | 6 (14.6) | 12 (29.3) | 19 (46.3) | 3 (7.3) | 41 (100.0) | 3.41 (0.921) | |
| | 55 years or older | 2 (9.1) | 2 (9.1) | 8 (36.4) | 8 (36.4) | 2 (9.1) | 22 (100.0) | 3.27 (1.077) | |
| | Total | 8 (3.4) | 25 (10.5) | 54 (22.7) | 108 (45.4) | 43 (18.1) | 238 (100.0) | 3.64 (1.003) | |
| Academic qualification | High school diploma | 5 (8.8) | 8 (14.0) | 17 (29.8) | 24 (42.1) | 3 (5.3) | 57 (100.0) | 3.21 (1.048) | 9.14 (.000) a<b,c |
| | Bachelor's degree | 3 (2.5) | 14 (11.5) | 27 (22.1) | 51 (41.8) | 27 (22.1) | 122 (100.0) | 3.70 (1.020) | |
| | Master's degree or higher | 0 (0.0) | 3 (5.0) | 10 (16.7) | 33 (55.0) | 14 (23.3) | 60 (100.0) | 3.97 (0.780) | |
| | Total | 8 (3.3) | 25 (10.5) | 54 (22.6) | 108 (45.2) | 44 (18.4) | 239 (100.0) | 3.65 (1.005) | |

The following table is the brief summary of differences in the response result across occupations and average monthly incomes. The extent to which electronic devices are used at work varies according to job. Housewives (3.31) and those working in the service sector or technical fields (3.31) used the devices relatively sparsely, while those in administrative positions use them the most (4).

**Table 19** Extent to which learners use electronic devices for time and resource management

(Unit: Person, %)

| Division | | Never use | Do not use | Average | Use | Often use | Total | Average (Standard deviation) | F(t) Value (Significance probability) |
|---|---|---|---|---|---|---|---|---|---|
| Occupation | Administrative | 0 (0.0) | 0 (0.0) | 2 (12.5) | 12 (75.0) | 2 (12.5) | 16 (100.0) | 4.00 (0.516) | 2.14 (.050) |
| | Professional | 1 (2.0) | 3 (6.0) | 10 (20.0) | 26 (52.0) | 10 (20.0) | 50 (100.0) | 3.82 (0.896) | |
| | Clerical | 1 (2.4) | 4 (9.5) | 9 (21.4) | 17 (40.5) | 11 (26.2) | 42 (100.0) | 3.79 (1.025) | |
| | Service · Technical | 2 (8.3) | 4 (16.7) | 6 (25.0) | 8 (33.3) | 4 (16.7) | 24 (100.0) | 3.33 (1.204) | |
| | Student | 0 (0.0) | 1 (5.9) | 7 (41.2) | 8 (47.1) | 1 (5.9) | 17 (100.0) | 3.53 (0.717) | |
| | Housewife | 2 (4.8) | 9 (21.4) | 9 (21.4) | 18 (42.9) | 4 (9.5) | 42 (100.0) | 3.31 (1.070) | |
| | Other | 0 (0.0) | 1 (7.7) | 4 (30.8) | 4 (30.8) | 4 (30.8) | 13 (100.0) | 3.85 (0.987) | |
| | Total | 6 (2.9) | 22 (10.8) | 47 (23.0) | 93 (45.6) | 36 (17.6) | 204 (100.0) | 3.64 (0.990) | |
| Average monthly income | Less than 2 million won | 2 (3.9) | 7 (13.7) | 13 (25.5) | 14 (27.5) | 15 (29.4) | 51 (100.0) | 3.65 (1.163) | 0.01 (.986) |
| | Between 2~4 million won | 1 (1.1) | 10 (11.1) | 19 (21.1) | 48 (53.3) | 12 (13.3) | 90 (100.0) | 3.67 (0.887) | |
| | More than 4 million won | 2 (4.0) | 4 (8.0) | 11 (22.0) | 24 (48.0) | 9 (18.0) | 50 (100.0) | 3.68 (0.999) | |
| | Total | 5 (2.6) | 21 (11.0) | 43 (22.5) | 86 (45.0) | 36 (18.8) | 191 (100.0) | 3.66 (0.991) | |

An analysis of the effect of average monthly income on use of electronic devices found that average monthly income was not a statistically significant factor. Those

earning less than 2 million won scored 3.65 and those earning more than 4 million won scored 3.68.

As has been shown above, most learners already had devices for e-learning (desktop computers, 21.5%, laptops, 18.8%, and mobile phones 16.6%) and have a strong desire to buy smart phones, smart pads or e-book devices within a year (smart phones, 30.7%, smart pads, 14.0%, e-book devices, 14.0%). The devices which they plan to buy are those that have been launched recently. Most (75%) of the learners use and are familiar with the electronic networks and devices such as the Internet, mobile phones and laptops, and as most of them use these devices for time or resource management (66%), it appears that e-learning is laying the groundwork for the ubiquitous learning era.

### 3) E-learning needs for lifelong learning in the ubiquitous environment

Through an analysis of the awareness of and preparedness for the ubiquitous environment aforementioned, one can see that the groundwork for learning in the ubiquitous environment is being laid. The question becomes: what kind of e-learning needs would lifelong learners have in the ubiquitous environment? The e-learning needs of lifelong learners have been examined in the following order: 1) intention to participate in lifelong learning through mobile learning; 2) preferred learning method on the move; 3) intention to use a smart phone application to access e-learning lectures; 4) needs for mobile learning by subjects; 5) learning support needed for e-learning and mobile learning; and 6) requirements for active e-learning and mobile learning.

#### (1) Intention to participate in lifelong learning through mobile learning

Learners, lifelong educators and professors were asked whether they would participate in a lifelong learning course if the opportunity to engage in lifelong learning via mobile devices was given. Responses were measured on a 5 point Likert scale, with 1 being no intention to taking part in mobile learning and 5 showing a high inclination to participate. Based on the frequency response for each category and the average score, differences across the background variables were analyzed.

**Table 20** Intention to participate in lifelong learning through mobile learning

(Unit: Person, %)

| Division | | None | Little | Average | A little | Fairly | Total | Average (Standard deviation) | F(t) Value (Significance probability) |
|---|---|---|---|---|---|---|---|---|---|
| Group | Learner | 12 (5.0) | 32 (13.3) | 51 (21.2) | 84 (34.9) | 62 (25.7) | 241 (100.0) | 3.63 (1.15) | 7.45 (.001) a<c |
| | Lifelong educator | 0 (0.0) | 1 (5.0) | 4 (20.0) | 7 (35.0) | 8 (40.0) | 20 (100.0) | 4.10 (0.91) | |
| | Professor | 0 (0.0) | 2 (5.4) | 3 (8.1) | 13 (35.1) | 19 (51.4) | 37 (100.0) | 4.32 (0.85) | |
| Gender | Male | 3 (2.8) | 13 (12.0) | 22 (20.4) | 39 (36.1) | 31 (28.7) | 108 (100.0) | 3.76 (1.08) | 0.13 (.900) |
| | Female | 9 (4.7) | 22 (11.6) | 36 (18.9) | 65 (34.2) | 58 (30.5) | 190 (100.0) | 3.74 (1.15) | |
| Age | 34 years or younger | 2 (1.7) | 13 (11.3) | 22 (19.1) | 40 (34.8) | 38 (33.0) | 115 (100.0) | 3.86 (1.06) | 0.71 (.546) |
| | Between 35~44 | 7 (6.1) | 13 (11.4) | 21 (18.4) | 37 (32.5) | 36 (31.6) | 114 (100.0) | 3.72 (1.20) | |
| | Between 45~54 | 2 (4.4) | 6 (13.3) | 11 (24.4) | 14 (31.1) | 12 (26.7) | 45 (100.0) | 3.62 (1.15) | |
| | 55 years or older | 1 (4.3) | 3 (13.0) | 3 (13.0) | 13 (56.5) | 3 (13.0) | 23 (100.0) | 3.61 (1.03) | |
| | Total | 12 (4.0) | 35 (11.7) | 58 (19.5) | 104 (34.9) | 89 (29.9) | 298 (100.0) | 3.75 (1.13) | |

Almost two-thirds of respondents (64.8%) reported that they intend to take part in lifelong learning programs with mobile learning, and the 3.75 score on the Likert scale was fairly high. The learner participation score was 3.65, and the lifelong educator and professor participation scores were 4.10 and 4.2, respectively. It is noteworthy that the learner group scored lowest. Participation should be high among the learners who will carry out lifelong learning activities rather than those who will provide mobile learning, yet the expectation and the participation intention of program providers was higher. Learners who showed the lowest rate of participation intention in mobile learning were examined across the background variables: 64.8% showed

an intention to participate in lifelong learning programs through mobile learning, with a fairly high score of 3.75.

There was no statistically relevant difference within gender or age groups. The participation intention scores of men and women were 3.76 and 3.74 respectively. In terms of age, learners 34 years old or younger showed relatively high participation intention with 3.86, but this was not much higher than those 55 years old or older (3.61). Table 21 summarizes differences across the background variables. Learners with master's degrees or higher had the lowest score of 3.46, while those with bachelor's degrees had the highest score (3.73). However, the difference was not so large, even when taking account of those with only high school diplomas.

In terms of occupation, the difference in scores is greater than it is for age groups, but on the whole remains small. While the scores are high for students and those in the administrative positions (4.00), participation intention scores for the learners in professional positions and housewives were relatively low. Just by looking at the scores, it seems that there are differences among some groups but if the scores and their occupations are considered together, there seems to be no special trend. It is difficult to determine the reason for the deviation in scores. It seems that in the case of students, they are more familiar with mobile devices and furthermore, since they already use smart phones and smart pads for e-learning programs, they have less participation intention than other occupation groups.

Lastly, participation intention across average monthly incomes, found that learners with an income of less than 2 million won had the highest score of participation intention of 4.06. Those whose incomes are between 2 million and 4 million won (3.45) and more than 4 million won (3.58) had lower participation intention. This result is quite unexpected, considering that purchasing and using mobile devices are quite expensive. Though the financial conditions of the low-income learner group do not support mobile learning, their expectations for mobile learning is higher than others groups.

**Table 21** Intention of participating in lifelong learning through mobile learning (learners)

(Unit: Person, %)

| Division | | None | Little | Average | A little | fairly | Total | Average (Standard deviation) | F(t) Value (Significance probability) |
|---|---|---|---|---|---|---|---|---|---|
| Academic qualification | High school diploma | 3 (5.3) | 7 (12.3) | 14 (24.6) | 19 (33.3) | 14 (24.6) | 57 (100.0) | 3.60 (1.15) | 1.19 (.307) |
| | Bachelor's degree | 8 (6.5) | 14 (11.4) | 16 (13.0) | 50 (40.7) | 35 (28.5) | 123 (100.0) | 3.73 (1.18) | |
| | Master's degree or higher | 1 (1.6) | 11 (18.0) | 21 (34.4) | 15 (24.6) | 13 (21.3) | 61 (100.0) | 3.46 (1.07) | |
| | Total | 12 (5.0) | 32 (13.3) | 51 (21.2) | 84 (34.9) | 62 (25.7) | 241 (100.0) | 3.63 (1.15) | |
| Occupation | Administrative | 0 (0.0) | 0 (0.0) | 4 (25.0) | 8 (50.0) | 4 (25.0) | 16 (100.0) | 4.00 (0.73) | 0.97 (.446) |
| | Professional | 2 (3.8) | 8 (15.4) | 15 (28.8) | 15 (28.8) | 12 (23.1) | 52 (100.0) | 3.52 (1.13) | |
| | Clerical | 1 (2.4) | 8 (19.0) | 7 (16.7) | 17 (40.5) | 9 (21.4) | 42 (100.0) | 3.60 (1.11) | |
| | Service · Technical | 2 (8.3) | 2 (8.3) | 4 (16.7) | 9 (37.5) | 7 (29.2) | 24 (100.0) | 3.71 (1.23) | |
| | Student | 0 (0.0) | 0 (0.0) | 5 (29.4) | 7 (41.2) | 5 (29.4) | 17 (100.0) | 4.00 (0.79) | |
| | Housewife | 3 (7.1) | 6 (14.3) | 8 (19.0) | 14 (33.3) | 11 (26.2) | 42 (100.0) | 3.57 (1.23) | |
| | Other | 2 (15.4) | 3 (23.1) | 2 (15.4) | 2 (15.4) | 4 (30.8) | 13 (100.0) | 3.23 (1.54) | |
| | Total | 10 (4.9) | 27 (13.1) | 45 (21.8) | 72 (35.0) | 52 (25.2) | 206 (100.0) | 3.63 (1.14) | |
| Average monthly income | Less than 2 million won | 1 (1.9) | 2 (3.8) | 8 (15.4) | 23 (44.2) | 18 (34.6) | 52 (100.0) | 4.06 (0.92) | 5.04 (.007) a>b |
| | Between 2~4 million won | 5 (5.5) | 18 (19.8) | 18 (19.8) | 31 (34.1) | 19 (20.9) | 91 (100.0) | 3.45 (1.19) | |
| | More than 4 million won | 2 (4.0) | 7 (14.0) | 15 (30.0) | 12 (24.0) | 14 (28.0) | 50 (100.0) | 3.58 (1.16) | |
| | Total | 8 (4.1) | 27 (14.0) | 41 (21.2) | 66 (34.2) | 51 (26.4) | 193 (100.0) | 3.65 (1.14) | |

**(2) Preferred learning method on the move**

Learning methods available and preferred by the learners on the move are examined below. Out of eight learning methods, learners were told to select the most preferred method and according to their preferences, the methods have been arranged.

**Table 22** Preferred learning method on the move

(Unit: Person, %)

| Division | | Wi-Fi Lectures | MP3 Lectures | Textbook/ Reference | Reading online educational materials | Upload and share | Reading other students' posting | Student/ professor communi-cation | Do not want to study | Total | (Significance probability) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Gender | Male | 35 (36.8) | 28 (29.5) | 6 (6.3) | 7 (7.4) | 3 (3.2) | 4 (4.2) | 11 (11.6) | 1 (1.1) | 95 (100.0) | 6.64 (.467) |
| | Female | 46 (31.5) | 47 (32.2) | 19 (13.0) | 5 (3.4) | 3 (2.1) | 10 (6.8) | 13 (8.9) | 3 (2.1) | 146 (100.0) | |
| | Total | 81 (33.6) | 75 (31.1) | 25 (10.4) | 12 (5.0) | 6 (2.5) | 14 (5.8) | 24 (10.0) | 4 (1.7) | 241 (100.0) | |
| Age | 34 years or younger | 32 (36.8) | 19 (21.8) | 8 (9.2) | 6 (6.9) | 3 (3.4) | 6 (6.9) | 10 (11.5) | 3 (3.4) | 87 (100.0) | 19.16 (.575) |
| | Between 35~44 | 32 (35.6) | 29 (32.2) | 10 (11.1) | 3 (3.3) | 1 (1.1) | 7 (7.8) | 7 (7.8) | 1 (1.1) | 90 (100.0) | |
| | Between 45~54 | 10 (24.4) | 17 (41.5) | 4 (9.8) | 3 (7.3) | 2 (4.9) | 1 (2.4) | 4 (9.8) | 0 (0.0) | 41 (100.0) | |
| | 55 years or older | 6 (27.3) | 10 (45.5) | 3 (13.6) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 3 (13.6) | 0 (0.0) | 22 (100.0) | |
| | Total | 80 (33.3) | 75 (31.3) | 25 (10.4) | 12 (5.0) | 6 (2.5) | 14 (5.8) | 24 (10.0) | 4 (1.7) | 240 (100.0) | |
| Academic qualifi-cation | High school diploma | 16 (28.1) | 18 (31.6) | 9 (15.8) | 3 (5.3) | 3 (5.3) | 2 (3.5) | 3 (5.3) | 3 (5.3) | 57 (100.0) | 17.73 (.219) |
| | Bachelor's degree | 42 (34.1) | 43 (35.0) | 11 (8.9) | 5 (4.1) | 1 (.8) | 7 (5.7) | 13 (10.6) | 1 (.8) | 123 (100.0) | |
| | Master's degree or higher | 23 (37.7) | 14 (23.0) | 5 (8.2) | 4 (6.6) | 2 (3.3) | 5 (8.2) | 8 (13.1) | 0 (0.0) | 61 (100.0) | |
| | Total | 81 (33.6) | 75 (31.1) | 25 (10.4) | 12 (5.0) | 6 (2.5) | 14 (5.8) | 24 (10.0) | 4 (1.7) | 241 (100.0) | |

Learners' most preferred method of learning was watching online lectures through Wi-Fi (36.3%), followed by watching online lectures stored in their mp3 players (31.6%). This is because various online lectures are being offered and social trends show the number of online learners increasing. Moreover, the experience of having prepared for a university entrance exam through online lectures during middle and high school years will reduce resistance towards online lectures when these students become adult learners. In the future, the demand for online lectures is expected to grow.

According to th+e background variables, male learners were likely to listen to Wi-Fi lectures (36.8%) more than lectures on their MP3 players (29.5%). This was true of women as well. They use MP3 players to listen to music. Considering that it is difficult to download lectures and store them on an MP3 player, this explains the low rate. Across the age groups, there is no characteristic difference. However, there is a slight difference of preference in Wi-Fi devices and MP3 players between the those younger than 45 and the those older than 45: 35% of the learners that were 44 years and younger listened to the lectures via Wi-Fi, however, the rate decreased to 24~27% among those 45 years or older. On the other hand, the rate of them listening to the lectures on MP3 players is between 41~45%. The rate of young learners having iPods, smart phones and smart pads, through which they can use Wi-Fi, was quite high and they were familiar with using them. On the contrary, the rate of the older learners, those 45 years or older, having these devices was not only low but since they are not familiar with Wi-Fi environments, it seems they preferred listening to the lectures on MP3 players.

In terms of academic qualifications, as the learners' academic qualifications rose, they preferred streaming service through Wi-Fi to MP3 players. Learners with only high school diplomas, apart from these two methods, preferred reading textbooks or reference books on the move (15.8%). Whether or not learners have the devices has a great effect since they need to have Wi-Fi devices or mp3 players separately.

**Table 23** Preferred learning method on the move

(Unit: Person, %)

| Division | | Wi-Fi lectures | MP3 lectures | Textbook/ Reference | Reading online educational materials | Upload and share | Reading other students' posting | Student/ professor communi-cation | Do not want to study | Total | (Significance probability) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Occup-ation | Admini-strative | 5 (31.3) | 9 (56.3) | 0 (0.0) | 0 (0.0) | 1 (6.3) | 0 (0.0) | 1 (6.3) | 0 (0.0) | 16 (100.0) | 60.58 (.032) |
| | Professional | 21 (40.4) | 12 (23.1) | 5 (9.6) | 4 (7.7) | 0 (0.0) | 5 (9.6) | 5 (9.6) | 0 (0.0) | 52 (100.0) | |
| | Clerical | 14 (33.3) | 13 (31.0) | 3 (7.1) | 1 (2.4) | 3 (7.1) | 2 (4.8) | 4 (9.5) | 2 (4.8) | 42 (100.0) | |
| | Service · Technical | 14 (58.3) | 3 (12.5) | 0 (0.0) | 4 (16.7) | 0 (0.0) | 0 (0.0) | 3 (12.5) | 0 (0.0) | 24 (100.0) | |
| | Student | 5 (29.4) | 6 (35.3) | 3 (17.6) | 1 (5.9) | 0 (0.0) | 1 (5.9) | 1 (5.9) | 0 (0.0) | 17 (100.0) | |
| | Housewife | 7 (16.7) | 16 (38.1) | 10 (23.8) | 1 (2.4) | 2 (4.8) | 2 (4.8) | 4 (9.5) | 0 (0.0) | 42 (100.0) | |
| | Other | 6 (46.2) | 3 (23.1) | 1 (7.7) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 2 (15.4) | 1 (7.7) | 13 (100.0) | |
| | Total | 72 (35.0) | 62 (30.1) | 22 (10.7) | 11 (5.3) | 6 (2.9) | 10 (4.9) | 20 (9.7) | 3 (1.5) | 206 (100.0) | |
| Average monthly income | Less than 2 million won | 20 (38.5) | 19 (36.5) | 3 (5.8) | 4 (7.7) | 2 (3.8) | 1 (1.9) | 2 (3.8) | 1 (1.9) | 52 (100.0) | 10.83 (.700) |
| | Between 2~4 million won | 31 (34.1) | 26 (28.6) | 9 (9.9) | 6 (6.6) | 1 (1.1) | 6 (6.6) | 11 (12.1) | 1 (1.1) | 91 (100.0) | |
| | More than 4 million won | 19 (38.0) | 16 (32.0) | 5 (10.0) | 1 (2.0) | 2 (4.0) | 1 (2.0) | 6 (12.0) | 0 (0.0) | 50 (100.0) | |
| | Total | 70 (36.3) | 61 (31.6) | 17 (8.8) | 11 (5.7) | 5 (2.6) | 8 (4.1) | 19 (9.8) | 2 (1.0) | 193 (100.0) | |

According to the difference in the response result across the occupation groups given in the above table, the rate of having Wi-Fi devices is relatively low among students and housewives. So rather than listening to the online lectures via Wi-Fi, they preferred listening to the lectures on MP3 players or reading textbooks and reference books.

There is no big difference in the response result across the average monthly incomes.

According to the table above, learners whose average monthly income is less than 2 million won also preferred listening to lectures on the MP3 players (36.5%) or via Wi-Fi (38.5%). Considering the price of needed devices for their learning, they were expected to respond differently according to personal finances. However, the result data has revealed that the personal finance does not affect their choice of learning methods.

Therefore, rather than the price burden for needed devices for e-learning courses, whether the learners currently have them has a greater effect. Moreover, just as it was shown in the data of e-learning device ownership, smart phones are not affected by the average monthly income since they are in common use, and the price of MP3 players has fallen. Hence, what kind of devices learners have, more than their income, affects their e-learning methods.

**(3) Intention to use a smart phone application to access e-learning lectures**

A more detailed question was asked to identify learners' intention to use a smart phone application to access e-learning lectures. The survey was conducted for all respondents, and their responses were measured on the Likert scale.

**Table 24** Intention to use a Smartphone application to access e-learning lectures

(Unit: Person, %)

| Division | | None | Little | Average | A little | fairly | Total | Average (Standard deviation) | F(t) Value (Significance probability) |
|---|---|---|---|---|---|---|---|---|---|
| Group | Learner | 12 (5.0) | 22 (9.2) | 50 (20.8) | 86 (35.8) | 70 (29.2) | 240 (100.0) | 3.75 (1.12) | 4.41 (.013) b<c |
| | Lifelong educator | 0 (0.0) | 6 (30.0) | 5 (25.0) | 6 (30.0) | 3 (15.0) | 20 (100.0) | 3.30 (1.08) | |
| | Professor | 0 (0.0) | 0 (0.0) | 6 (16.2) | 19 (51.4) | 12 (32.4) | 37 (100.0) | 4.16 (0.69) | |
| Gender | Male | 4 (3.7) | 9 (8.4) | 21 (19.6) | 41 (38.3) | 32 (29.9) | 107 (100.0) | 3.82 (1.07) | 0.61 (.542) |
| | Female | 8 (4.2) | 19 (10.0) | 40 (21.1) | 70 (36.8) | 53 (27.9) | 190 (100.0) | 3.74 (1.10) | |
| Age | 34 years or younger | 4 (3.5) | 13 (11.4) | 21 (18.4) | 41 (36.0) | 35 (30.7) | 114 (100.0) | 3.79 (1.11) | 0.95 (.418) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Between 35~44 | 4 (3.5) | 10 (8.8) | 20 (17.5) | 46 (40.4) | 34 (29.8) | 114 (100.0) | 3.84 (1.06) | |
| | Between 45~54 | 3 (6.7) | 2 (4.4) | 13 (28.9) | 14 (31.1) | 13 (28.9) | 45 (100.0) | 3.71 (1.14) | |
| | 55 years or older | 1 (4.3) | 3 (13.0) | 7 (30.4) | 9 (39.1) | 3 (13.0) | 23 (100.0) | 3.43 (1.04) | |
| | Total | 12 (4.0) | 28 (9.4) | 61 (20.5) | 111 (37.4) | 85 (28.6) | 297 (100.0) | 3.77 (1.09) | |

According to the data results, 67.0% of respondents answered that they intend to use smart phones. On the 5-point scale, the score of 3.77 was relatively a high. According to the respondents' groups, professors showed the highest score (4.16) while the learners had a score of 3.75, similar to the average. When compared with their mobile learning participation intention score (3.36), they seem to be more positive towards smart phones. Nonetheless, it is still important to take note that the professors viewed this more positively than the learners.

On the other hand, there is no great difference among the responses across gender and age. The difference in the respondents' intention to use the application between male (3.82) and female learners (3.74) was only 0.08, which indicates there is almost no difference. Among responses across age groups, except for the fact that the learners 55 years or older had a relatively low score of 3.43 all the other groups showed their desire to use the application (3.7~3.9). This difference was not statistically significant. Learners' intention to use the application is examined below.

**Table 25** Intention to use a Smartphone application to access e-learning lectures (learners)

(Unit: Person, %)

| Division | | None | Little | Average | A little | fairly | Total | Average (Standard deviation) | F(t) Value (Significance probability) |
|---|---|---|---|---|---|---|---|---|---|
| Academic qualification | High school diploma | 4 (7.0) | 6 (10.5) | 12 (21.1) | 19 (33.3) | 16 (28.1) | 57 (100.0) | 3.65 (1.20) | 0.30 (.741) |
| | Bachelor's degree | 7 (5.7) | 9 (7.3) | 24 (19.5) | 47 (38.2) | 36 (29.3) | 123 (100.0) | 3.78 (1.12) | |
| | Master's degree or higher | 1 (1.7) | 7 (11.7) | 14 (23.3) | 20 (33.3) | 18 (30.0) | 60 (100.0) | 3.78 (1.06) | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | 12 (5.0) | 22 (9.2) | 50 (20.8) | 86 (35.8) | 70 (29.2) | 240 (100.0) | 3.75 (1.12) | |
| Occupation | Administrative | 0 (0.0) | 2 (13.3) | 1 (6.7) | 6 (40.0) | 6 (40.0) | 15 (100.0) | 4.07 (1.03) | 1.54 (.166) |
| | Professional | 1 (1.9) | 6 (11.5) | 11 (21.2) | 14 (26.9) | 20 (38.5) | 52 (100.0) | 3.88 (1.11) | |
| | Clerical | 0 (0.0) | 3 (7.1) | 6 (14.3) | 23 (54.8) | 10 (23.8) | 42 (100.0) | 3.95 (0.82) | |
| | Service·Technical | 2 (8.3) | 2 (8.3) | 3 (12.5) | 7 (29.2) | 10 (41.7) | 24 (100.0) | 3.88 (1.30) | |
| | Student | 1 (5.9) | 1 (5.9) | 5 (29.4) | 6 (35.3) | 4 (23.5) | 17 (100.0) | 3.65 (1.11) | |
| | Housewife | 4 (9.5) | 3 (7.1) | 15 (35.7) | 13 (31.0) | 7 (16.7) | 42 (100.0) | 3.38 (1.15) | |
| | Other | 2 (15.4) | 2 (15.4) | 1 (7.7) | 4 (30.8) | 4 (30.8) | 13 (100.0) | 3.46 (1.51) | |
| | Total | 10 (4.9) | 19 (9.3) | 42 (20.5) | 73 (35.6) | 61 (29.8) | 205 (100.0) | 3.76 (1.12) | |
| Average monthly income | Less than 2 million won | 3 (5.8) | 4 (7.7) | 11 (21.2) | 15 (28.8) | 19 (36.5) | 52 (100.0) | 3.83 (1.18) | 0.12 (.887) |
| | Between 2~4 million won | 4 (4.4) | 10 (11.1) | 15 (16.7) | 37 (41.1) | 24 (26.7) | 90 (100.0) | 3.74 (1.11) | |
| | More than 4 million won | 1 (2.0) | 5 (10.0) | 12 (24.0) | 16 (32.0) | 16 (32.0) | 50 (100.0) | 3.82 (1.06) | |
| | Total | 8 (4.2) | 19 (9.9) | 38 (19.8) | 68 (35.4) | 59 (30.7) | 192 (100.0) | 3.79 (1.11) | |

First of all, in the response result of academic qualifications, all the groups showed similar scores of 3.7. The learners with high school diplomas had the lowest score of 3.65, but it was not much different from the score of those with bachelor's degrees and higher (3.78).

There are slight differences across the occupation groups, but since they are not statistically significant generalization is difficult. Housewives had the lowest score (3.38). The score of students was slightly higher (3.65), but is still low in comparison with the other groups.

As has been discussed above, the reason for this result appears to be the low rate of smart phone or smart pad ownership among housewives and students.

Lastly, there seems to be almost no difference across average monthly income groups. The rate of learners whose income is between 2~4 million won is relatively low (3.74), showing the lowest intention for participation. Learners whose income is less than 2 million won had the highest score (3.83), which indicates that the average monthly incomes do not create differences.

**(4) Needs for mobile learning by subjects**

Next, the needs for mobile learning by subjects are examined among learners and lifelong educators, and on the Likert scale. The result has been summarized into the following table.

**Table 26** Needs for mobile learning by subject

(Average, standard deviation)

| Division | | Adult literacy | Academic improvement | Job training | Culture and art | Liberal arts | Citizen participation |
|---|---|---|---|---|---|---|---|
| Group | Learner | 2.89 (1.31) | 3.58 (1.18) | 4.00 (1.03) | 3.82 (0.88) | 3.86 (0.92) | 3.55 (1.03) |
| | Lifelong educator | 2.30 (1.17) | 3.30 (0.98) | 4.15 (0.88) | 3.70 (1.13) | 4.20 (0.77) | 3.80 (1.11) |
| | F Value (Significance probability) | 1.95 (.053) | 1.04 (.297) | −0.63 (.528) | 0.56 (.577) | −1.62 (.107) | −1.04 (.301) |
| Gender | Male | 2.83 (1.25) | 3.39 (1.16) | 3.83 (1.16) | 3.90 (0.89) | 3.84 (0.99) | 3.46 (1.07) |
| | Female | 2.85 (1.34) | 3.66 (1.16) | 4.12 (0.92) | 3.76 (0.90) | 3.91 (0.86) | 3.63 (1.02) |
| | T Value (Significance probability) | −0.08 (.933) | −1.87 (.062) | −2.05 (.042) | 1.21 (.226) | −0.55 (.581) | −1.32 (.187) |
| Age | 34 years or younger | 2.81 (1.27) | 3.44 (1.16) | 3.99 (1.02) | 3.79 (0.98) | 3.76 (0.94) | 3.33 (1.15) |
| | Between 35~44 | 2.87 (1.32) | 3.67 (1.11) | 4.25 (0.81) | 3.92 (0.83) | 4.01 (0.88) | 3.79 (0.92) |
| | Between 45~54 | 2.88 (1.38) | 3.24 (1.30) | 3.63 (1.30) | 3.61 (0.95) | 3.76 (0.92) | 3.71 (0.98) |
| | 55 years or older | 2.82 (1.33) | 4.09 (0.92) | 3.68 (1.09) | 3.77 (0.69) | 4.14 (0.83) | 3.41 (0.85) |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | F Value (Significance probability) | 0.05 (.986) | 3.26 (.022) | 4.65 (.003) | 1.23 (.301) | 2.11 (.099) | 3.86 (.010) |
| Total | | 2.84 (1.30) | 3.56 (1.17) | 4.01 (1.02) | 3.81 (0.90) | 3.88 (0.91) | 3.57 (1.04) |

The most preferred subject area was job training (4.01), followed by liberal arts (3.88), and culture and art (3.81). The need for adult literacy was quite low (2.84). This shows that the rate of adults having literacy difficulty was very low and it was based on the assumption that the learners would not have any literacy difficulties if the learners were able to engage in mobile learning. Hence, if the mobile learning programs are developed in the future, the portion of literacy programs should be adjusted accordingly, unlike in the past.

The result of the respondents' background variables is as following. First of all, though the trend across the groups is generally similar, the need for adult literacy seems to show a statically significant difference. Both groups showed a negative view of adult literacy, but lifelong educators seemed to hold more negative view of it. In the field of academic improvement, learners showed a higher score (3.58) than that of lifelong educators (3.30), while in the fields of liberal arts and citizen participation, lifelong educators (4.20 and 3.80, respectively) showed higher scores than learners (3.86 and 3.55, respectively). Gender differences were found. Female learners felt a higher need for job training; the difference with male learners was 0.39, which is statically significant. Male learners showed a slightly higher score in culture and art, and citizen participation, but it was not statistically significant.

Differences across age groups were statically significant in the areas of academic improvement, job training and citizen participation. In the area of academic improvement, the learners who were 55 years or older seemed to feel the need for it the most (4.09), while in the area of job training, learners between 35 and 44 years old (4.25) felt the need of it more than the other groups.

Table 27 examines the differences in learners' responses across background variables in detail. According to the result, there are some characteristic responses among the

learners with only high school diplomas. In Korea, considering the rate of high school entrance is about 90%, a high school diploma is relatively common. For learners older than 60 years, the high school diploma is not a low academic qualification, however for most of learners who engage in e-learning, it is likely that a high school diploma is an academic qualification below average. Therefore, the learners with only a high school diploma wish that new mobile learning would help them improve their academic qualifications. Moreover, if learners had some literacy difficulties, they would have some interest in adult literacy. Hence, as has been seen in the result data, among learners with only high school diplomas the needs for adult literacy and academic improvement were higher.

According to the data across the occupation groups, learners in clerical positions (3.60), service or technical fields (3.71), or students (3.65) and housewives (3.83), showed a greater demand for academic improvement. But in the area of adult literacy, learners in the administrative (2.38) and professional positions (2.62) showed little demand, while the learners in the service sectors or technical fields (3.13) showed more than average demand. However, the difference across the occupation groups in all the fields was not statically significant.

Lastly, the differences across average monthly incomes were examined. Among the learners whose income is less than 2 million won, there was high demand in general, though this did not create statically significant difference among the groups. In the areas of adult literacy, academic improvement and citizen participation, there were relatively high score differences.

**Table 27** Needs for mobile learning by subject (learners)

(Average, standard deviation)

| Division | | Adult literacy | Academic improvement | Job training | Culture/ art | Liberal arts | Citizen participation |
|---|---|---|---|---|---|---|---|
| Academic qualification | High school diploma | 3.04 (1.27) | 4.05 (0.93) | 4.07 (0.90) | 3.84 (0.77) | 3.96 (0.89) | 3.74 (0.88) |
| | Bachelor's degree | 2.96 (1.37) | 3.63 (1.19) | 4.07 (1.09) | 3.80 (0.93) | 3.82 (0.93) | 3.54 (1.03) |
| | Master's degree or higher | 2.61 (1.19) | 3.05 (1.16) | 3.79 (1.00) | 3.82 (0.87) | 3.84 (0.93) | 3.39 (1.14) |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | F Value (Significance probability) | 1.97 (.141) | 11.86 (.000) | 1.76 (.174) | 0.04 (.963) | 0.51 (.602) | 1.66 (.193) |
| Occupation | Administrative | 2.38 (1.09) | 3.13 (1.26) | 4.00 (1.03) | 3.81 (1.05) | 3.75 (1.24) | 3.81 (1.11) |
| | Professional | 2.62 (1.37) | 3.27 (1.25) | 4.00 (0.99) | 3.87 (0.89) | 4.00 (0.86) | 3.44 (1.07) |
| | Clerical | 2.98 (1.18) | 3.60 (1.15) | 4.10 (0.91) | 3.81 (0.77) | 3.64 (0.88) | 3.40 (0.96) |
| | Service · Technical | 3.13 (1.26) | 3.71 (1.43) | 3.92 (1.10) | 3.92 (0.83) | 4.00 (0.98) | 3.42 (1.18) |
| | Student | 3.06 (1.09) | 3.65 (1.00) | 3.94 (1.03) | 3.82 (0.73) | 4.00 (0.71) | 3.76 (0.75) |
| | Housewife | 2.95 (1.43) | 3.83 (0.99) | 3.90 (1.05) | 3.90 (0.76) | 3.95 (0.79) | 3.79 (0.95) |
| | Other | 3.46 (1.27) | 4.08 (1.12) | 4.23 (1.17) | 3.38 (1.26) | 3.62 (1.04) | 3.38 (1.26) |
| | F Value (Significance probability) | 1.48 (.187) | 1.77 (.107) | 0.27 (.950) | 0.69 (.657) | 1.05 (.397) | 1.01 (.418) |
| Average monthly income | Less than 2 million won | 3.12 (1.22) | 3.96 (1.17) | 4.06 (1.02) | 3.96 (0.82) | 4.10 (0.77) | 3.77 (0.96) |
| | Between 2~4 million won | 2.75 (1.30) | 3.46 (1.20) | 4.02 (1.00) | 3.78 (0.87) | 3.78 (0.92) | 3.44 (1.02) |
| | More than 4 million won | 2.68 (1.35) | 3.24 (1.13) | 3.84 (1.02) | 3.78 (0.93) | 3.80 (1.01) | 3.46 (1.13) |
| | F Value (Significance probability) | 1.79 (.170) | 5.15 (.007) | 0.71 (.492) | 0.82 (.440) | 2.21 (.112) | 1.84 (.161) |
| Total | | 2.89 (1.31) | 3.58 (1.18) | 4.00 (1.03) | 3.82 (0.88) | 3.86 (0.92) | 3.55 (1.03) |

**(5) Learning support needed for e-learning and mobile learning**

Learning support needed to carry out e-learning and mobile learning easily is summarized in following table. It is limited to learners. According to the result, questions and answers for learning content, and the need for online tutors that (41.7%) were indentified the most frequently, followed by solutions for device use and technical problems, and technical support (25.0%).

According to the result in terms of gender, while demand for the online tutors was 50% among male learners, among female learners it was only 36.3%. On the contrary, their demands for technical support (27.4%) and the sharing of learning know-how and experiences (19.9%) were fairly high. Nonetheless, the difference across gender is not statistically significant and it is difficult to generalize the result.

**Table 28** Learning support needed for e-learning and mobile learning

(Unit: Person, %)

| Division | | Online tutor | Detailed explanation of learning methods | Sharing learning know-how and experiences | Technical support | Others | Total | (Significance Probability) |
|---|---|---|---|---|---|---|---|---|
| Gender | Male | 47 (50.0) | 11 (11.7) | 14 (14.9) | 20 (21.3) | 2 (2.1) | 94 (100.0) | 5.31 (.257) |
| | Female | 53 (36.3) | 17 (11.6) | 29 (19.9) | 40 (27.4) | 7 (4.8) | 146 (100.0) | |
| | Total | 100 (41.7) | 28 (11.7) | 43 (17.9) | 60 (25.0) | 9 (3.8) | 240 (100.0) | |
| Age | 34 years or younger | 39 (45.3) | 9 (10.5) | 14 (16.3) | 20 (23.3) | 4 (4.7) | 86 (100.0) | 12.15 (.433) |
| | Between 35~44 | 38 (42.2) | 8 (8.9) | 18 (20.0) | 22 (24.4) | 4 (4.4) | 90 (100.0) | |
| | Between 45~54 | 10 (24.4) | 8 (19.5) | 7 (17.1) | 15 (36.6) | 1 (2.4) | 41 (100.0) | |
| | 55 years or older | 12 (54.5) | 3 (13.6) | 4 (18.2) | 3 (13.6) | 0 (0.0) | 22 (100.0) | |
| | Total | 99 (41.4) | 28 (11.7) | 43 (18.0) | 60 (25.1) | 9 (3.8) | 239 (100.0) | |
| Academic qualification | High school diploma | 22 (38.6) | 6 (10.5) | 11 (19.3) | 15 (26.3) | 3 (5.3) | 57 (100.0) | 1.43 (.994) |
| | Bachelor's degree | 51 (41.8) | 16 (13.1) | 22 (18.0) | 29 (23.8) | 4 (3.3) | 122 (100.0) | |
| | Master's degree or higher | 27 (44.3) | 6 (9.8) | 10 (16.4) | 16 (26.2) | 2 (3.3) | 61 (100.0) | |
| | Total | 100 (41.7) | 28 (11.7) | 43 (17.9) | 60 (25.0) | 9 (3.8) | 240 (100.0) | |

In the case of age, there is a different response trend between the learners who are 55 years or older and the learners who are younger than 55 years. Among the learners who are 54 years or younger, the demand for online tutors decreased while the demand for technical support increased. Among learners who are 55 years or older, the demand for online tutors was very high (54.5%) whereas the demand for technical support was only 13.6%. In general, the older one gets the more difficulties he or she has with the new device use and their technical problems. This is an interesting finding. There is a need to look into the reason for this trend through future research. One possible answer is that older learners are in great need of online tutors and they might think can solve technical problems through online tutors. However, this difference does not hold any statistical significance so it will be hard to make generalization based on this result.

The difference across the academic qualifications was minute. Higher academic qualification showed higher demand for online tutors. However, in terms of the response result there was no significant difference. Demand for technical support and the sharing of learning know-how did not have a consistent trend with the academic qualifications. The following table summarizes learners' response results according to occupation and average monthly incomes. According to the data, the difference across the occupation groups was not large. Preferred learning support was different with regard to the occupations, but as the number of the respondents dispersed, the response rate could change greatly. Hence, this difference cannot be deemed large.

**Table 29** Learning support needed for e-learning and mobile learning

(Unit: Person, %)

| Division | | Online tutor | Detailed explanation of learning methods | Sharing learning know-how and experiences | Technical support | Others | Total | (Significance Probability) |
|---|---|---|---|---|---|---|---|---|
| Occupation | Administrative | 8 (50.0) | 2 (12.5) | 3 (18.8) | 3 (18.8) | 0 (0.0) | 16 (100.0) | 31.51 (.140) |
| | Professional | 21 (40.4) | 3 (5.8) | 11 (21.2) | 16 (30.8) | 1 (1.9) | 52 (100.0) | |
| | Clerical | 18 (42.9) | 5 (11.9) | 6 (14.3) | 13 (31.0) | 0 (0.0) | 42 (100.0) | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Service · Technical | 8 (33.3) | 4 (16.7) | 3 (12.5) | 7 (29.2) | 2 (8.3) | 24 (100.0) | |
| | Student | 9 (52.9) | 4 (23.5) | 3 (17.6) | 1 (5.9) | 0 (0.0) | 17 (100.0) | |
| | Housewife | 16 (38.1) | 2 (4.8) | 10 (23.8) | 11 (26.2) | 3 (7.1) | 42 (100.0) | |
| | Other | 6 (46.2) | 4 (30.8) | 0 (0.0) | 1 (7.7) | 2 (15.4) | 13 (100.0) | |
| | Total | 86 (41.7) | 24 (11.7) | 36 (17.5) | 52 (25.2) | 8 (3.9) | 206 (100.0) | |
| Average monthly income | Less than 2 million won | 19 (36.5) | 7 (13.5) | 11 (21.2) | 14 (26.9) | 1 (1.9) | 52 (100.0) | 3.92 (.865) |
| | Between 2~4 million won | 39 (42.9) | 10 (11.0) | 13 (14.3) | 26 (28.6) | 3 (3.3) | 91 (100.0) | |
| | More than 4 million won | 24 (48.0) | 4 (8.0) | 10 (20.0) | 10 (20.0) | 2 (4.0) | 50 (100.0) | |
| | Total | 82 (42.5) | 21 (10.9) | 34 (17.6) | 50 (25.9) | 6 (3.1) | 193 (100.0) | |

As the income increased, the demand for online tutors increased. Nevertheless, in the fields of sharing learning know-how and experiences and technical support there was no characteristic trend, and the response rate showed a mixed trend. As a result, there was no statically significant difference.

**(6) Requirements for active e-learning and mobile learning**

In the last question of the survey, learners were asked about requirements for active e-learning and mobile learning are. According to the data, 28.3% of the respondents answered that it should be support for telecommunication and education expenses. However, the reinforcement of learning motives and strategies (18.9%), the content quality certification (18.2%), and accreditation and use (17.2%) had fairly high rates as well.

**Table 30** Requirements for active e-learning and mobile learning

(Unit: Person, %)

| Division | | Law/ regulation improve-ment | Telecommuni-cation/learning cost support | E-learning contents quality certification | Reinforcement of learning motive and strategies | Beautiful design | Accredit-ation and use | Mobile device support | Others | Total | (Significance probability) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Gen-der | Male | 7 (6.5) | 35 (32.7) | 20 (18.7) | 26 (24.3) | 0 (0.0) | 9 (8.4) | 6 (5.6) | 4 (3.7) | 107 (100.0) | 14.55 (.042) |
| | Female | 8 (4.2) | 49 (25.8) | 34 (17.9) | 30 (15.8) | 1 (.5) | 42 (22.1) | 20 (10.5) | 6 (3.2) | 190 (100.0) | |
| Age | 34 years or younger | 9 (7.9) | 28 (24.6) | 16 (14.0) | 21 (18.4) | 0 (0.0) | 21 (18.4) | 13 (11.4) | 6 (5.3) | 114 (100.0) | 24.39 (.275) |
| | Between 35~44 | 3 (2.6) | 35 (30.7) | 28 (24.6) | 18 (15.8) | 1 (.9) | 19 (16.7) | 9 (7.9) | 1 (.9) | 114 (100.0) | |
| | Between 45~54 | 1 (2.2) | 17 (37.8) | 5 (11.1) | 11 (24.4) | 0 (0.0) | 6 (13.3) | 2 (4.4) | 3 (6.7) | 45 (100.0) | |
| | 55 years or older | 2 (8.7) | 4 (17.4) | 4 (17.4) | 6 (26.1) | 0 (0.0) | 5 (21.7) | 2 (8.7) | 0 (0.0) | 23 (100.0) | |
| | Total | 15 (5.1) | 84 (28.3) | 54 (18.2) | 56 (18.9) | 1 (.3) | 51 (17.2) | 26 (8.8) | 10 (3.4) | 297 (100.0) | |

Regardless of the gender, the respondents most wanted support for telecommunication expense (men 32.6%, women 25.8%). The second most wanted support was different with regard to gender. Men (24.3%) thought the reinforcement of learning motives and strategies important, while women (22.1%) thought accreditation and use important. And while 5.6% of the men opted for support for mobile devices, 10.5% of the women chose it.

Through the data result of the e-learning and mobile learning related device ownership, the reason for this trend can be speculated. The women appeared to own fewer state-of-the-art devices for e-learning and mobile learning than the men, so this difference in the e-learning and mobile learning environments may have affected the result. The learners wanted support for telecommunication and education expenses the most regardless of the age. Learners between 45~54 showed the highest rate, with 37.8%. Learners 45 years or older wanted the reinforcement of learning motives and strategies the most, while among learners who are 55 years or older, accreditation and use

also showed a high rate. Moreover, learners between 35 and 44 asserted that e-learning content quality certification was also needed along with support for telecommunication and education expenses. The following table surveys the requirements for active e-learning and mobile learning among learners.

**Table 31** Requirements for active e-learning and mobile learning (learners)

(Unit: Person, %)

| Division | | Law/ regulation Improvement | Telecommunication/learning cost support | E-learning contents quality certification | Reinforcement of learning motive and strategies | Beautiful design | Accreditation and use | Mobile device support | Others | Total | (Significance probability) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Academic qualification | High school diploma | 2 (3.5) | 9 (15.8) | 14 (24.6) | 13 (22.8) | 1 (1.8) | 11 (19.3) | 3 (5.3) | 4 (7.0) | 57 (100.0) | 19.38 (.151) |
| | Bachelor's degree | 7 (5.7) | 44 (36.1) | 19 (15.6) | 18 (14.8) | 0 (0.0) | 16 (13.1) | 15 (12.3) | 3 (2.5) | 122 (100.0) | |
| | Master's degree or higher | 3 (4.9) | 21 (34.4) | 13 (21.3) | 11 (18.0) | 0 (0.0) | 8 (13.1) | 4 (6.6) | 1 (1.6) | 61 (100.0) | |
| | Total | 12 (5.0) | 74 (30.8) | 46 (19.2) | 42 (17.5) | 1 (.4) | 35 (14.6) | 22 (9.2) | 8 (3.3) | 240 (100.0) | |
| Occupation | Administrative | 1 (6.3) | 7 (43.8) | 2 (12.5) | 4 (25.0) | 0 (0.0) | 1 (6.3) | 1 (6.3) | 0 (0.0) | 16 (100.0) | 44.21 (.379) |
| | Professional | 2 (3.8) | 15 (28.8) | 14 (26.9) | 8 (15.4) | 0 (0.0) | 8 (15.4) | 4 (7.7) | 1 (1.9) | 52 (100.0) | |
| | Clerical | 2 (4.8) | 15 (35.7) | 6 (14.3) | 6 (14.3) | 0 (0.0) | 8 (19.0) | 3 (7.1) | 2 (4.8) | 42 (100.0) | |
| | Service · Technical | 1 (4.2) | 7 (29.2) | 4 (16.7) | 6 (25.0) | 0 (0.0) | 1 (4.2) | 4 (16.7) | 1 (4.2) | 24 (100.0) | |
| | Student | 3 (17.6) | 5 (29.4) | 2 (11.8) | 2 (11.8) | 1 (5.9) | 1 (5.9) | 2 (11.8) | 1 (5.9) | 17 (100.0) | |
| | Housewife | 1 (2.4) | 11 (26.2) | 9 (21.4) | 6 (14.3) | 0 (0.0) | 8 (19.0) | 7 (16.7) | 0 (0.0) | 42 (100.0) | |
| | Other | 1 (7.7) | 2 (15.4) | 2 (15.4) | 3 (23.1) | 0 (0.0) | 3 (23.1) | 0 (0.0) | 2 (15.4) | 13 (100.0) | |
| | Total | 11 (5.3) | 62 (30.1) | 39 (18.9) | 35 (17.0) | 1 (.5) | 30 (14.6) | 21 (10.2) | 7 (3.4) | 206 (100.0) | |
| Average monthly income | Less than 2 million won | 3 (5.8) | 17 (32.7) | 6 (11.5) | 7 (13.5) | 1 (1.9) | 10 (19.2) | 6 (11.5) | 2 (3.8) | 52 (100.0) | 9.22 (.817) |
| | Between 2~4 million won | 4 (4.4) | 26 (28.6) | 22 (24.2) | 18 (19.8) | 0 (0.0) | 10 (11.0) | 9 (9.9) | 2 (2.2) | 91 (100.0) | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | More than 4 million won | 2 (4.0) | 16 (32.0) | 9 (18.0) | 10 (20.0) | 0 (0.0) | 8 (16.0) | 4 (8.0) | 1 (2.0) | 50 (100.0) |
| | Total | 9 (4.7) | 59 (30.6) | 37 (19.2) | 35 (18.1) | 1 (.5) | 28 (14.5) | 19 (9.8) | 5 (2.6) | 193 (100.0) |

For the differences across academic qualifications, learners with bachelor's degrees or higher wanted support for telecommunication expenses and learning costs (36.1% and 34.4%, respectively). Whereas, the learners with only high school diplomas thought e-learning contents quality certification (24.6%) and the reinforcement of learning motives and strategies (22.8%) to be more important. Yet, the difference of .05 was not statistically significant.

Moreover, the difference across occupation groups was not statistically significant. The number of respondents in some occupation groups was too small to make generalizations. And since there is a difference of one or two people in the rates, limits to summarize the opinions of the occupation groups are strong. Looking at the responses of the learners in professional and clerical position, and those who were housewives, which had relatively more respondents, the learners that were professionals wanted support for telecommunication and education expenses (28.8%), and e-learning content quality certification (26.9%) almost equally. On the contrary, learners who were in clerical positions wanted support for telecommunication and education expenses (35.7%) more than support for accreditation and use (19.0%). Lastly, for housewives there was no big difference between support for telecommunication and education expenses (26.2%), and e-learning content quality certification (21.4%). Unlike the other occupation groups, mobile device support was relatively higher (16.7%).

Even across the average monthly incomes, there was no statistically significant difference. Hence, there is a limitation in generalizing results. Upon examining the results of the categories with great differences, the learners whose income is between 2 and 4 million won showed the most demand for e-learning content quality certification, whereas in the reinforcement of learning motives and strategies the learners whose income is less than 2 million won showed a higher rate. Since the selection trend across the different income groups does not appear to be directly related to

the requirements for active e-learning and mobile learning, it is difficult to determine the reason for the difference.

After gathering the result data of the requirements, 64.8% of the respondents showed an inclination towards lifelong learning through mobile learning. And moreover, 67.0% of the learners showed an intention to use a smart phone application to access online lectures. In addition, the learners' most preferred methods of learning were listening to online lectures via Wi-Fi (36.3%) and on MP3 players (31.6%). The need for online tutors (41.7%) was pointed out as the most needed learning support for active e-learning and mobile learning, and support for telecommunication or education expenses was considered the most important support for active e-learning and mobile learning.

# V Conclusion and Suggestions

## V.1 Conclusion

### 1) Status of participation in e-learning

Almost all (90%) of respondents have participated in e-learning, mainly via a PC utilizing the websites of distance education institutions and cyber universities. It has been found that the degree of e-learning participation is higher among learners with higher degrees, and the younger the learner is, the more diverse the mode of e-learning is. Interestingly, the degree of e-learning participation is the highest among those above age 55, and it is the lowest among respondents aged 45-54, from which it can be inferred that people are satisfying their desire to learn after retirement, which could not be met while they were working. Therefore, to meet such needs, various e-learning programs targeting the elderly should be developed. Moreover, 73.9% of

the learners take e-learning programs via PC, and 19.7% of them use laptops. Only 2.5% of the learners are using smart phones for e-learning, which shows that the recent popular wave of smart phones has not yet reached e-learning programs. Modes of e-learning are diverse among young learners, and it thus can be expected that e-learning will take various forms other PCs. Therefore, it indicates that the design of e-learning programs for the young should be diversified according to their preference and life patterns. Also among the young age group, none of the 146 women students were using smart phones for e-learning purposes. Therefore, efforts will have to be to increase the use of devices, including mobile e-learning, among women, in preparation for further expansion of mobile e-learning through smart phones.

### 2) Awareness of and preparedness for the ubiquitous environment

Most (75.5%) of the learners use electronic networks and devices, such as the Internet, mobile phones, and laptops. Most of the learners have various devices for e-learning (PC,21.5%, laptops,18.8%, MP3 players,17.0%, mobile phones, 16.6%), and expressed strong willingness to purchase devices such as smart phones, smart pads, and e-book devices within one year (smart phones, 30.7%, smart pads, 14.0%, e-book related devices, 14.0%). The devices they plan on purchasing within a year are those launched recently, and already 63.6% of learners manage schedules and data through electronic devices, which indicate that the foundation has been laid to move to a ubiquitous age from an e-learning era.

In particular, while women have standardized e-learning related devices, men have more diverse e-learning devices (such as iPods, Tablet PCs, smart pads, and e-book devices). Almost none of the housewives had the latest devices, which points to the need for guidelines and training for housewives on how to use them effectively in order to prepare e-learning programs in the ubiquitous environment. In addition, the use of high-end devices corresponds to the income level, and therefore, how to support costs for e-learning devices in the ubiquitous environment should be discussed for lifelong learning for all. Smart phones, smart pads, and e-book devices rank high among e-learning devices the learners plan on purchasing within one year, and what's interesting is the lower the income has the stronger the willingness to

purchase smart phones, and the weakest intention to purchase smart pads. It indicates that although the use of both devices is rapidly increasing, learners are making a reasonable choice between smart phones and smart pads. Moreover, the lower the age group has the highest use of electronic devices, and the highest degree of use of electronic devices is found among those with higher educational qualifications, which indicate that the more exposed the learners are to diverse electronic devices, the higher the use of such devices. Therefore, more consideration should be given to lower income groups and housewives, who have little exposure to various electronic devices.

### 3) Demand for e-learning for lifelong education in the ubiquitous environment

Almost two-thirds (64.8%) of respondents expressed willingness to participate in lifelong education through mobile learning, however, the participation intention was higher among teachers than learners: the participation score for the learners was 3.63, for lifelong educators it was 4.10, and for teachers it was 4.2. This was because program providers such as teachers have better access to information on the positive impact of the ubiquitous environment, and as such, there is a need to provide opportunities for learners so that they may share such positive expectations and design e-learning for lifelong learning in the ubiquitous environment. When asked if they were willing to use smart phone applications for e-learning, 67.0% of the respondents answered positively, which indicated that they had positive expectations for a change in the e-learning modes in the ubiquitous environment. Notably, the highest point for participation intension (4.06) was seen among the lowest income group, which indicates that although they may not have enough financial resources for the ubiquitous environment, they have high expectations for learning in it. It implies that support measures for the low income groups should be considered so that they may not be left out of the new lifelong learning environment.

The most popular learning modes were watching Internet lecturers via Wi-Fi (36.3%) and watching lecture footage stored in MP3 players (31.6%). In particular, while among those below age 44, Internet lectures via Wi-Fi accounted for over 35%, among those above age 45, lecture recordings via MP3 players accounted for 41-45%.

This probably is because the greater number of young learners have iPods, smart phones, or smart pads which can access Wi-Fi, and they are familiar with those devices, while not many of people above 45 have such devices, nor are they familiar with them, and as such they prefer storing Internet lectures in MP3 players. Therefore, in designing e-learning in the ubiquitous environment, preferences across age groups should be analyzed and reflected. In making changes in the devices, such differences should be taken into account, and the reason for the low preference should be identified, and measures should be devised accordingly.

With regard to the need for mobile learning according to different areas of learning, vocational education is ranked the highest (4.01), adult literacy is ranked considerably low (2.84). This provides lessons on what area of learning should be focused on when designing mobile learning programs.

Lastly, as for support for e-learning and mobile learning, online tutoring is ranked the highest (41.7%), followed by technical support for utilization of devices and trouble shooting (25.0%). With regard to the promotion of e-learning and mobile learning, financial support for telecommunication/education expenses (28.3) is considered to be the most important. It indicates that such learning support is essential for the success of e-learning programs for lifelong education in the ubiquitous environment.

## V.2 Suggestions

Based on the aforementioned conclusion, the following suggestions may be made for the success of lifelong e-learning in the ubiquitous environment.

First, it is imperative to develop learning-teaching models to promote u-learning in lifelong learning. While there are u-schools in primary and secondary education, and u-campuses in higher education, u-LLL (Lifelong Learning) does not exist at present. The effectiveness and satisfaction with u-school and u-campus models have been proven through extensive research and experimentation, and various value-added products have been in use with u-learning support by the government.

The boundaries between classroom and the outside world will weaken in future education. Various attempts will be made to promote u-learning, and they will ultimately lead to convergence of educational systems. Therefore, there is a need for a medium to long term change in the relationship between u-School/u-Campus and u-LLL (Lifelong Learning). Lifelong learning has a positive impact on many factors of social cohesion, such as modes of formal education for adults (Su-Myung Jang, 2009). Moreover, until the early 20th century, knowledge learned during school years was utilized for life. Now, however, quantity of knowledge changes so swiftly that a junior student of engineering will have to update the knowledge gained in the freshman year by up to 50% before graduating. Therefore, with endless learning, adequate learning-teaching models must be developed for effective lifelong learning. Second, there should be support for those social groups that are left out of the ubiquitous learning environment. U-learning infrastructure support is needed to promote u-learning and to bridge the gap in u-learning information. Such examples include provision of u-learning devices for the underprivileged in terms of ICT, financial support for telecommunication and education expenses. According to the information gap index by the Ministry of Public Administration Security in 2010, the information index of the underprivileged class as compared to the national average was 69.7%. However, the budget allocation for improving the information index of the underprivileged declined from 25.3 billion in 2007 to 18.4 billion in 2009 (2009. National Information Society Agency). The rate of Internet use of the underprivileged as compared to the national average was 77.6%, the rate of PC distribution was 81.4%, and examination by sub-category revealed that the rate for the disabled as compared to the national average was 80.3%, 79.5% for lower income groups, 65.9% for the elderly, and 60.3% for farmers/fishermen who were ranked the lowest (2010 Information gap index survey). To improve the situation, the Ministry of Education, Science and Technology has instituted support measures for children of lower income groups, providing PCs, and financial support for Internet bills: Between 2000 and 2009 about 920,000 people (2000-2009) received support. However, there was no support for adult or out-of-classroom learners. Therefore, there is a need for support measures, such as vouchers for u-learning, to increase the accessibility of the ICT

underprivileged to u-learning and reduce social conflicts.

Third, there is a need for educational support not only to ensure u-learning accessibility, but also to enhance learners' self-initiative. In today's ubiquitous environment, such traits as independent discipline, self-monitoring, self-motivation and self-learning are of particular importance. "Learning how to learn," a state or skill of being cognizant of one's own learning, and independent learning, have long been the primary objectives of adult education (Caffarella 1993:29) As Caffarella (1993) observed that self-initiative is the ability to decide content, place, methods, and pace of learning, and it is a very significant skill to actively cope with personal and social changes. To foster this ability, the teacher will have to regard his/her role as guide and facilitator rather than deliverer, and will have to provide learners with opportunities to make decisions for their learning, and through appropriate teaching-learning techniques, help learners to manage their learning process in a responsible manner.

Fourth, there should be educational assessment of technologies, not just about their use as a tool. To this end, the origins of various technologies, and their characteristics and functions must be understood. Moreover, based on such understanding, the kind of impact technologies have with regard to the formal/informal/non-formal learning of various learners groups must be explained. For example, there should be technical research on not only educational requirements of learners' groups in the ubiquitous era, but also on the characteristics of hypertext and learning impact, awareness of a specific technology among diverse learners' groups, and its modes of use, and various forms of learning in the ubiquitous environment. Such research will form useful basic data to build an educational environment that can foster lifelong learning and educational growth of learners of diverse age groups, social classes, gender, and different racial backgrounds in the ubiquitous society.

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# Driving e-Learning towards Ubiquitous e-Learning

03

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Prof Dr Mansor formerly worked as a full-time lecturer at the Faculty of Engineering, University of Malaya (UM). During his tenure at UM, he held various administrative posts and was responsible for introducing online learning to the UM lecturers in 1998.

Prof Dr Mansor was also instrumental in the establishment of OUM, Malaysia's first open and distance learning (ODL) institution in 2000. Some of his most recent projects include the university's mobile learning and question bank initiatives; its first mobile app (known as Virtual Store); and an online platform for fully-online courses (called EPiC).

## Latifah Abdol Latif

Prof Dr. Latifah Abdol Latif is currently serving as the Dean, Faculty of Science and Technology, Open University Malaysia (OUM), after serving as the Director, Center for Student Management between 2003-2009. She joined OUM in 2002 after taking a break from her 22 years of service in the University of Malaya (UM). She has written over 100 papers in various journals and conference proceedings during her tenure as an academic and an administrator in both UM and OUM. Besides publishing papers related to her professional field of Chemistry, she also contributed a significant number in the areas of e-learning, lifelong learning and student retention. As the Dean of Faculty of Science and Technology, her main focus is on developing relevant programmes for working adults, emphasizing on the development of lifelong learning skills, which will contribute towards Malaysia's human capital development in moving the nation towards a high-income developed status.

## Introduction

This research project was carried out to study the impact of e-learning materials and technology used in an open and distance learning (ODL) institution, i.e. Open University Malaysia (OUM). The e-learning materials and technology are anticipated to help encourage learners to fully embrace the university's e-learning environment as well as initiate the move towards ubiquitous learning. The research project was conducted via a cross-sectional survey analysis; using data collected through a survey of a random sample of 600 OUM learners. Data analysis involved investigating open and distance learners' technology acceptance as well as possible improvement and enhancement of the e-learning materials and technology for OUM to move forward towards the development of a more ubiquitous learning environment.

# 1 Background

At OUM, all academic programmes are generally delivered via a blended learning approach, i.e. a combination of online learning, self-managed learning and face-to-face tutorials. A major component that contributes to the blended pedagogy is e-learning. E-learning represents a platform which provides various forms of web-based learning materials and technology designed to add greater value to the teaching and learning process. These web-based learning materials are made available via the institution's learning management system known as myVLE, and can be accessed anywhere and at any time as long as learners are connected to the Internet. Some of these web-based materials are downloadable. Through myVLE, learners are also provided with an online discussion forum, a platform for learners to interact with peers, tutors and to get access to learning materials. Besides myVLE, other

technologies employed include an Internet radio (iRadio), OUM's official Internet radio station from which short learning segments are developed and broadcasted via the Internet. The segments aired over iRadio are readily downloadable in the form of MP3 files. Mobile learning (or m-learning), another technology used at OUM, is seen to be the next wave of learning given the fact that almost all OUM learners have mobile phones. The obvious advantage of m-learning is that it can enhance the blend of learning modes that are currently used; it can also increase the flexibility, portability and mobility of learning and in so doing encourages and supports ubiquitous learning. Other e-learning initiatives include the development of video lectures, known as iLectures, via the Internet. iLectures enable learners to view the lectures conducted by tutors or subject matter experts via the internet as and when required. Learners can download these lectures into their laptops, mobile phones, PDAs, and tablet computers, from which they can subsequently access the lectures at a convenient time and place. With so much effort directed at offering these study materials and technologies, it is important to determine how learners are accepting and using them in their studies at OUM.

## 2 Literature Review

Ubiquitous learning has been acknowledged as the 'next step' in e-learning. The successful development of a ubiquitous learning environment will owe itself to two critical factors, i.e. utilising appropriate technologies and introducing new pedagogical practices; indicating the importance of both computing technologies and teaching and learning paradigms (Gringer, 2009). Various pilot projects within the last decade that attempt to introduce a ubiquitous learning environment have involved experimentation with high-end devices, as seen in the initiatives by Harvard University

(Deiterle & Dede, 2006), University of Minnesota (Cunningham, 2010) and Reed College (Marmarelli & Ringle, 2010) in the United States of America. These devices invariably include handheld devices such as tablet computers, personal digital assistants (PDAs) and more recently, e-readers like the Amazon Kindle. This clearly indicates the influence of new devices, media and technological trends in teaching and learning approaches; particularly in terms of designing and complementing learning environments.

According to Lyytinen and Yoo (2002), learning environments can be classified into four types: desktop computer-assisted learning, pervasive learning, mobile learning and ubiquitous learning. As indicated in Figure 1, the type of learning environment offered by an institution is dependent on the level of embeddedness (in terms of the availability and use of technologies) and mobility of said technologies.

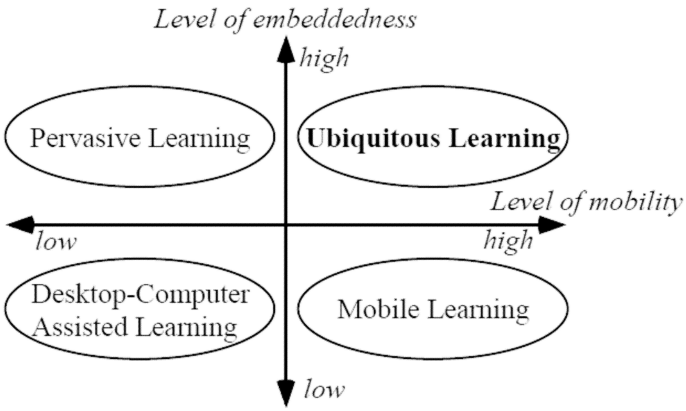


**Figure 1** Four Learning Environments
(Lyytinen & Yoo, 2002; as cited in Ogata & Yano, 2004)

At the most basic level, learning takes place at a fixed and stationary location with the aid of a desktop computer. Both mobile and pervasive learning can be considered an improvement from this basic level of learning environment. With the former, learners can use mobile devices such as laptops and tablet computers (e.g. Apple iPad) with Internet connection, to learn anytime and anywhere; whilst the latter allows

for contextual learning from devices that are usually embedded in a specific environment with a remote server. Ubiquitous learning is the most advanced of these learning environments, as it combines both high embeddedness and mobility. While a learner moves with his/her laptop, tablet computer or other devices, there is a system that can dynamically support his/her learning by communicating with embedded computers in the environment (Ogata & Yano, 2004). A further explanation of such an environment is when there is an intuitive architecture that identifies the right collaborators (i.e. lecturers, tutors, peers, et cetera), content and services at the right place and at the right time, based on a learner's surrounding context. This includes where and when the learner is, what resources and services are currently available to that learner as well as who are the parties that match the learner's need at that time (cited in Yang, 2006).

In the context of the learning environments as depicted in Figure 1, OUM's learning environment can be said to be currently positioned between desktop learning and mobile learning. As an ODL institution, OUM conducts academic programmes via a blended pedagogical approach that combines online learning, face-to-face tutorials and self-managed learning. Online learning activities are designed on an online platform, mostly through OUM's learning management system that is known as myVLE. This component is meant to augment the face-to-face interactions between learners and their tutors. The self-managed component is meant to encourage learners to complete the learning process independently through print modules and other learning materials in various formats. In 2010, OUM also introduced a new e-learning model (Mansor Fadzil & Latifah Abdol Latif, 2010) that gives greater attention to e-learning as a way to enhance teaching and learning and foster a culture of lifelong learning. In this new e-learning model, OUM has focused on improving its e-learning environment to create interfaces and multimedia that suit learner needs and can maximise the learning experience; as well as a system for continuous evaluation and more personalised content. At this juncture, OUM needs to determine just how this e-learning system, together with the corresponding materials and technology, is being perceived and used by its learners.

Various models have been developed to measure and explain the acceptance and usage of technology. One of the most widely accepted measurement tools is the Technology Acceptance Model or TAM (Davies, 1989). TAM originates from the theory of reasoned action or TRA (Fishbein & Ajzen, 1975). TRA proposes that belief affects attitude, which influences intention; while intention in turn brings about behaviours. TAM adapts this belief-attitude-behaviour relationship and further postulates that two beliefs (perceived ease of use and perceived usefulness) are the key beliefs that lead to user acceptance of information technology. Perceived ease of use is supposed to influence perceived usefulness, which has a direct effect on both attitude and intention.

In the TAM, two items were used to measure usage of the system. The first one refers to the frequency of use of the system. The second usage measure asked the respondents to specify how many hours they normally spent using the target system (Davies, 1993).

Compeau, Higgins and Huff (1999) developed a model based on Bandura's Social Cognitive Theory (as cited in Gardner & Amoroso, 2004) to study the influences of self-efficacy, performance and personal outcome expectations, effect and anxiety on computer usage. They found that self-efficacy explained 18% of the variance in an individual's usage. A relationship between personal outcome expectations and use was not supported.

However, Venkatesh, *et al*. (2003) found that self-efficacy and anxiety do not directly influence behavioural intention and suggested that these variables may be antecedents for one of the independent variables in their Unified Theory of Acceptance and Use of Technology (UTAUT).

In light of the above findings, a model was adapted based on TAM (1989), the model by Compeau, Higgins and Huff (1999), as well as the UTAUT (2003). The proposed model (discussed later) is used to explain usage of e-learning technology

in the context of OUM. In particular, this model would be used to determine the success and weaknesses of the present learning environment, e-learning materials and technology in adding value to the learners' learning experience. The information obtained can be used as the basis to move forward in further developing e-learning to support the progress towards a ubiquitous learning environment.

## 2.1 Objectives of Study

The objectives of this research are to obtain:

(a) a baseline assessment of learners' perceptions towards e-learning materials and technology
(b) learners' actual usage of e-learning materials and technology
(c) learners' feedback on the barriers, challenges and prospects of improving e-learning
(d) A measure of relationship between learners' perceptions and actual usage of e-learning materials and technology
(e) To discuss the implications of the findings of this study.

## 2.2 Research Model and Hypotheses

The proposed conceptual model adopted for this study is shown in Figure 1. Based on the above model, nine null hypotheses were formulated. The nine null hypotheses are:

H1: Perceived usefulness has no impact on attitude towards e-learning materials and technology
H2: Perceived ease of use has no impact on attitude towards e-learning materials

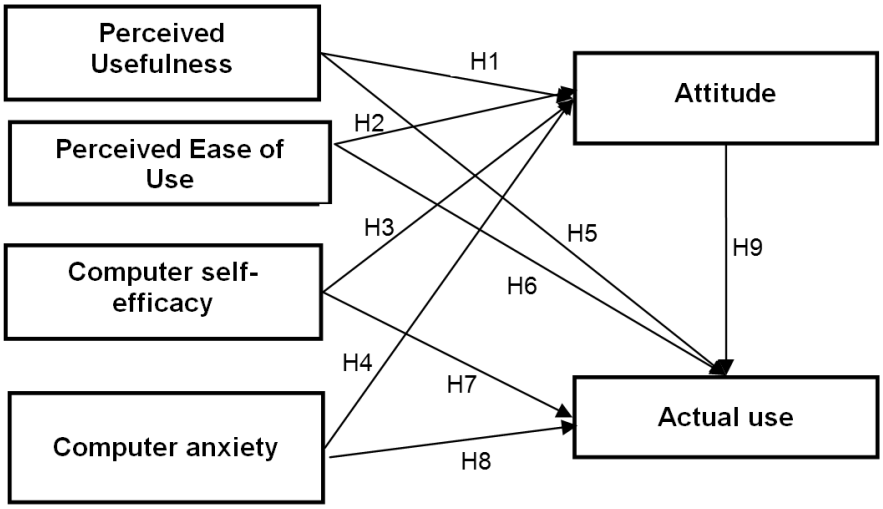


**Figure 1** Proposed Integrated TAM Model
(based on Davies, 1989; Compeau, Higgins & Huffs, 1999; and Venkatesh, *et al.*, 2003)

and technology

H3: Computer self-efficacy has no impact on attitude towards e-learning materials and technology

H4: Computer anxiety has no impact on attitude towards e-learning materials and technology

H5: Perceived usefulness has no impact on actual use of e-learning materials and technology

H6: Perceived ease of use has no impact on actual use of e-learning materials and technology

H7: Computer self-efficacy has no impact on actual use of e-learning materials and technology

H8: Computer anxiety has no impact on actual use of e-learning materials and technology

H9: Attitude has no impact on actual use of e-learning materials and technology

## 2.3 Research Questions

The research questions involved in this study are:

1. What are the learners' perceptions towards the various forms of e-learning materials and technology?
2. What are the learners' usage levels of e-learning materials and technology?
3. What are the barriers, challenges and prospects of e-learning?
4. Do the factors of perceived usefulness, perceived ease of use, computer self-efficacy, computer anxiety and attitude have an impact on the use of e-learning?

## 2.4 Significance of the Study

This study is important to understanding the role and impact of e-learning within the ODL environment. The research findings are expected to be used for driving future changes, enhancement and improvement of e-learning materials and technology to ensure better uptake, and at the same time providing clear input to the institution in its strategic plan to move forward to a more comprehensive ubiquitous learning environment.

## 2.5 Scope of Study

The study was confined to learners enrolled in one core course, i.e. "Learning Skills for Open and Distance Learners". The e-learning materials and technology included in the study were HTML modules, iRadio, iLectures, online discussion forum and mobile learning. The reasons for this study scope are that the e-learning materials and technology are some of OUM's best-developed and that this course is a compul-

sory course taken by all undergraduate learners.

# 3 Methodology

## 3.1 Sample Size

The sample size determined for the study was 600 OUM undergraduate learners from the population of learners who had taken the course "Learning Skills for Open and Distance Learners" between 2008 and 2011.

## 3.2 Questionnaire and Data Collection

The research instrument with five constructs used in this study was adapted from three theoretical models. The first three constructs i.e. perceived usefulness, perceived ease of use and attitude, were adapted from the TAM (Davis, 1989), while the fourth and fifth constructs, i.e. computer self-efficacy and computer anxiety, were adapted from the model by Compeau, Higgins and Huff (1999) and the UTAUT by Venkatesh, *et al*. (2003).

The questionnaire for the study was designed to collect the following categories of data: (a) demographic and other socioeconomic data such as age, sex, race, degree programmes; (b) five constructs given in Table 1; (c) usage of e-learning technologies; and (d) issues related to e-learning materials and technology. For measuring the five constructs for e-learning technology, learners were asked to provide responses to 15 statements based on a five-point scale, i.e. (Strongly Disagree); 2 (Slightly

Disagree), 3 (Neutral), 4 (Slightly Agree) and 5 (Strongly Agree).

**Table 1** The Five Constructs

| No | Construct | Statements/Items |
|---|---|---|
| 1. | Attitude towards e-learning technology | 1. Using e-learning technology is a good idea.<br>2. Using e-learning technology is beneficial for learning.<br>3. Using e-learning technology is innovative for learning. |
| 2. | Perceived usefulness towards e-learning technology | 1. Using e-learning technology has improved my learning performance.<br>2. Using e-learning technology has added value to my study.<br>3. Using e-learning technology makes my learning more engaging. |
| 3. | Perceived ease of use towards e-learning technology | 1. e-Learning technology is easy to learn.<br>2. e-Learning technology is easy to master.<br>3. e-Learning technology is easy to use. |
| 4. | Computer self-efficacy | 1. I use the computer for data analysis.<br>2. I use the computer for preparing reports.<br>3. I use the computer for searching information. |
| 5. | Computer anxiety | 1. I hesitate when using technology because I am afraid I will make mistakes.<br>2. I avoid using unfamiliar technology.<br>3. I am afraid I will break or damage the technology device that I am using. |

Learners were given a description of the e-learning materials and technology that were used for the "Learning Skills for Open and Distance Learners" module, as shown in Table 2 below:

**Table 2** Descriptions of the e-learning materials and technology

| e-Learning Materials | e-Learning Technology |
|---|---|
| HTML modules (modules in web-based format) | myVLE (web-based platform/ learning management system) |
| iRadio learning segments (course-specific infotainment programmes that are also downloadable) | iRadio (internet radio station) |
| iLectures (short vide lectures) | CD-ROM |

| | |
|---|---|
| Online forum discussions (specific topics in a course) | myVLE |
| Text messages (course-specific) learning segments, announcements, reminders and tips) | Mobile learning (delivered through mobile telephones) |

The questionnaire was uploaded online and the 600 selected respondents were contacted via e-mail and given a link to access and complete the said questionnaire. The entire operation of online data collection was carried out during the months of May and June 2011.

## 3.3 Results

### Respondent Profile

Out of the 600 selected respondents, 500 learners responded of which 438 completed questionnaires were usable, thereby giving an effective response rate of 73%. All the respondents were working adults, representing all 13 states in the country. All were also full-time employees either in the private or public sector. The mean age of the respondents was 32.7 years. The "19-29" age group formed 40.2% of the sample, with the two remaining age groups of "30-39" and "over 40" representing 40.9% and 18.9%, respectively. Female respondents represented 53.4% of the sample; slightly outnumbering their male counterparts. The undergraduate degree programmes taken up by the respondents were in the fields of nursing, business, education, social sciences and science studies. These figures show that the respondents have diverse demographic and socio-economic backgrounds, and hence, represent the general learner population of OUM.

### Reliability and Validity of Instrument

As noted earlier, the five constructs chosen for this study were perceived usefulness, perceived ease of use, attitude, computer anxiety, and computer self-efficacy. Before

deciding to use these constructs for analysis, the item ratings for the computer anxiety construct were also reversed in order to be in consistent order with the other four constructs. Next, the items representing all the five constructs were evaluated. This was done by examining their item-to-total correlations as suggested in Blaikie (2003). It was found that these correlations for all items exceeded the value of 0.8, which were above the recommended minimum level of 0.4. All the items were retained and further reliability test was carried out. The data was then factor analysed using both exploratory and confirmatory analyses. The factor analysis revealed that the Cronbach's Alpha values were in the region of 0.885 to .952 for the five constructs, which exceeded the minimum value of 0.7 as recommended in Nunnally (1988). Based on these test results, the five constructs were considered reliable.

The next test was to evaluate whether the measurement model for the five constructs provided a good fit to the actual data used. A total of five indices were used for the evaluation. The results as reported in Table 3 show reasonable goodness-of-fit indices ($\chi^2$/df = 2.29, NFI = .973, CFI = .985 and PCFI = .760, all of which exceeded the minimum recommended thresholds (Hair, *et al*., 2006); the value of RMSEA = .054 was less than the maximum allowed. These test results demonstrated that the measurement model and the instrument were acceptable for this study.

The research instrument was also evaluated from the perspectives of two criteria namely (a) convergent validity; and (b) discriminant validity. To establish convergent

**Table 3** Goodness-of-fit indices (n=438)

| Indices | Observed Values | Desired Range |
|---|---|---|
| Chi-square/df ($X^2$/df) | 2.29 | Less than 3 |
| Normal fit index (NFI) | .973 | > 0.90 |
| Comparative fit index (CFI) | .985 | > 0.90 |
| Parsimony Comparatives-of-fit Index (PCFI) | .760 | > 0.50 |
| Root Mean Square Error of approximation (RMSEA) | .054 | <0.07 |

validity, it was necessary to evaluate whether or not the item loadings on their respective five constructs exceeded the value of 0.5 (Hair, *et al*., 2006). To meet this goal, the instrument was subjected to confirmatory factor analysis (CFA) using the AMOS version 16.0 software to produce the factor loadings. It was found that the factor loadings as indicated by the standardised coefficients ranged from 0.787 to 0.969. This suggests convergent validity for the measurement instrument. The instrument was also evaluated for discriminant validity. Discriminant validity refers to the extent to which a construct is distinct from the other constructs. To establish discriminant validity, the average variance extracted (AVE) for a construct should exceed the shared variance (or square of the correlations) between two constructs (Fornell & Larcker, 1981). As indicated in Table 4, this condition was met and therefore discriminant validity for the research instrument was established.

**Table 4** Average variance extracted (AVEs) for discriminant validity analysis (n=438)

| Construct | Shared variances | AVE |
|---|---|---|
| Attitude | 0.026 ~ .790 | 0.912 |
| Perceived usefulness | 0.001 ~ .790 | 0.909 |
| Perceived ease of use | 0.038 ~ .529 | 0.902 |
| Computer anxiety | 0.009 ~ .042 | 0.845 |
| Computer self-efficacy | 0.042 ~ .303 | 0.818 |

### Perception towards e-Learning Materials/Technology

1. As shown in Table 5, the mean ratings for perceived ease of use and perceived usefulness of e-learning technology together with perceived usefulness of e-learning materials were moderately high at about 3.7-3.9 points on the five-point Likert scale; the ratings for computer self-efficacy and attitudes were higher with values between 4.1 and 4.2 points.
2. The reported computer anxiety was 2.6 points, which was considered low. This finding is consistent with the high values for computer self-efficacy noted earlier.

Table 5 Mean ratings of constructs

| Construct | Mean | Std. deviation |
|---|---|---|
| Computer self-efficacy of e-learning technology | 4.2 | .789 |
| Attitude towards use of e-learning materials | 4.1 | .859 |
| Attitude towards use of e-learning technology | 4.1 | .835 |
| Perceived usefulness of e-learning materials | 3.9 | .878 |
| Perceived usefulness of e-learning technology | 3.9 | .846 |
| Perceived ease of use of e-learning technology | 3.7 | .865 |
| Computer anxiety | 2.6 | 1.116 |

## Perception towards e-Learning Materials/Technology by Age Groups

1. An ANOVA was carried out to assess whether or not there were significant differences in the perception levels among the two older groups against the youngest group. (“29-39” and “40+” age groups against “19-29”)
2. As shown in Table 6, the mean ratings were significantly different for attitude and computer self-efficacy for both the two older groups against the younger 19-29 age group.
3. For the perceived usefulness construct, the difference was only significant for the 40+ age group.
4. There was no significant difference between the older 40+ and the younger 19-29 age group for perceived ease of use for e-learning technology.
5. With the exception of perceived ease of use, the mean ratings for the older learners were in fact higher than the younger 19-29 cohort, suggesting that this group of learners perceived technologies more favourably for e-learning.
6. For computer anxiety, there was no significant difference in the mean rating between the older and the younger age groups.

**Table 6** ANOVA results of mean ratings for e-learning material/technology by age group

| Constructs (for e-learning) | Age group (I) | Age group (J) | Mean difference (I-J) | P-value |
|---|---|---|---|---|
| Attitude | 19－29 | 30－39 | －.202 | .050 (s) |
| | | 40+ | －.486 | .000 (s) |
| Perceived usefulness | 19－29 | 30－39 | －.158 | .230 (ns) |
| | | 40+ | －.364 | .004 (s) |
| Perceived ease of use | 19－29 | 30－39 | －..009 | 1.000 (ns) |
| | | 40+ | －.189 | .302 (ns) |
| Computer self-efficacy | 19－29 | 30－39 | －.234 | .014 (s) |
| | | 40+ | －.417 | .000 (s) |
| Computer anxiety | 19－29 | 30－39 | +.011 | 1.000 (ns) |
| | | 40+ | －.124 | 1.000 (ns) |

## Usage of e-Learning Materials/Technologies

1. As indicated in Table 7, the study found that a learner spent a total of 10.7 hours a week using e-learning materials for the "Learning Skills for Open and Distance Learners" course.
2. The usage was primarily focused on the HTML module (35.5%), online discussion forum (30.8%), followed by iLectures (20.6%) and iRadio learning segments (13.1%).

**Table 7** Usage of e-learning

| Types of e-learning materials | % (hours per week) |
|---|---|
| HTML module | 35.5% (3.8 hours) |
| Online discussion forum | 30.8% (3.3 hours) |
| iLectures | 20.6% (2.2 hours) |
| iRadio learning segments | 13.1% (1.4 hours) |
| Total for all types | 100.0% (10.7 hours) |

## Usage of e-Learning Materials/Technologies by Age Group

1. ANOVA was performed to determine whether or not there were significant differences in the usage of e-learning technologies between the younger and older learners.
2. As is evident in Table 8, time spent on the HTML module by the two older groups of learners was not significantly different from that of the youngest group.
3. A similar usage pattern was also apparent for the other three remaining technologies, i.e. iRadio, iLectures and online discussion forum.
4. These results suggest that older learners are just as likely to spend time using e-learning technologies as their younger counterparts.

**Table 8** ANOVA results on usage of e-learning technologies

| Types of e-learning technologies | Age group (I) | Age group (J) | Mean difference (I-J) | P-value |
|---|---|---|---|---|
| HTML module | 19－29 | 30－39 | －.739 | .093 (ns) |
| | | 40 + | +.283 | 1.000 (ns) |
| iRadio | 19－29 | 30－39 | +.261 | .721 (ns) |
| | | 40 + | +.178 | 1.000 (ns) |
| iLectures | 19－29 | 30－39 | +.241 | 1.000 (ns) |
| | | 40 + | +.664 | .166 (ns) |
| Online discussion forum | 19－29 | 30－39 | －.704 | .088 (ns) |
| | | 40 + | +.108 | 1.000 (ns) |

## Usage of e-Learning Material/Technology by the Number of Hours

1. Table 9 shows that between 25.1% (or one in four) and 39.7% (or two in five) of the respondents did not use the iLectures and iRadio learning segments.
2. While the non-usage of the HTML module and online discussion forum was considerably less, the proportion of this group of learners is still substantially large at about 7%.
3. The under-utilisation of e-learning is also revealed by the high proportions (i.e.

13.5%－31.1%) of learners who used these technologies for only one to two hours a week.

**Table 9** Usage of e-learning by no. of hours

| Usage (hours) | HTML module | Online forum | iLectures | iRadio |
|---|---|---|---|---|
| | % | | | |
| 0 | 6.6 | 6.2 | 25.1 | 39.7 |
| 1 | 20.5 | 29.0 | 30.1 | 31.1 |
| 2 | 20.5 | 22.4 | 19.2 | 13.5 |
| 3 | 13.0 | 11.4 | 7.3 | 5.3 |
| 4+ | 39.4 | 31.0 | 18.3 | 10.4 |
| Total | 100.0% | 100.0% | 100.0% | 100.0% |

## Ownership of Mobile Devices

In an effort to drive e-learning towards ubiquitous learning, it is not adequate for the institution to merely develop and provide an e-learning system for the learners. Learners themselves must also equip themselves with devices that can be used for e-learning. It is therefore essential for learners to have mobile devices such as laptop or desktop computers, mobile telephones, MP3 or MP4 players that can utilise the e-learning materials and technology that are accessible through the Internet via myVLE.

**Table 10** Ownership of devices

| Devices | Ownership (%) |
|---|---|
| Mobile telephone | 95.4 |
| Laptop computer | 90.9 |
| Desktop computer | 56.8 |
| MP3 player | 36.3 |
| MP4 player | 13.7 |
| Tablet computer (e.g. iPad) | 8.2 |

1. Ownership of mobile devices amongst OUM learners is notably high, with rates of 95.4 % for mobile telephones, 90.9% for laptop computers, 36.3% for MP3 players and 13.7% for MP4 players (Table 10).
2. Tablet computers, still a relatively novel device, were owned by only 8.2% of the learners.
3. In addition, 56.8% of the respondents owned desktop computers.
4. These figures strongly suggest that there is a great potential for diffusing e-learn- ing among all learners via the use of mobile devices, in particular mobile phones and laptop computers.
5. In the near future, as tablet computers become more popular and affordable, they too can be utilised as a device for e-learning. When there is a conducive environment, both in terms of what the institution provides and what learners are comfortable with, learners can take up learning any place and at any time as long as they carry the appropriate mobile devices that can connect them to the Internet. This augurs well for lifelong learning as learners of all age groups can thus benefit from e-learning.

### Usage of Mobile Devices

1. As a measurement indicator, learners in this study were asked whether or not they downloaded the iLectures and iRadio learning segments.
2. The study found that the majority of learners had downloaded the materials into laptop computers, i.e. at 55.5% for iRadio learning segments and 61.2% for iLectures, respectively (Table 11).
3. Downloads into desktop computers were less popular, with corresponding figures falling between 34.5% and 36.3% for iRadio learning segments and iLectures, respectively.
4. These figures demonstrate that a large number of learners did make use of e-learning for their learning purposes.

Table 11 Downloads by device

| Devices | Download iRadio learning segment (%) | Download iLectures (%) |
|---|---|---|
| Mobile telephone | 15.8 | – |
| Laptop computer | 55.5 | 61.2 |
| Desktop computer | 34.5 | 36.3 |
| MP3 player | 11.9 | – |
| MP4 player | 6.6 | – |
| Tablet computer (e.g. iPad) | – | 6.8 |

## Factors affecting Attitude towards and Usage of e-Learning

1. The next step was to identify the factors that have an impact on the attitude towards and usage of e-learning technologies.
2. A multiple regression analysis (Table 12) found four factors (perceived usefulness, perceived ease of use, computer self-efficacy and computer anxiety) had positive and significant impacts on attitude towards e-learning (with an R-square of 74.4% and p-values < .05).
3. However, a separate regression analysis found only perceived usefulness had a significant impact on usage of e-learning technologies, with an R-square of 6%.
4. In summary, the results of the hypotheses testing are as follows:
   H1: Perceived usefulness has an impact on attitude towards e-learning materials and technology

Table 12 Factors affecting attitude towards e-learning (n=438)

| Variable | Unstandardised coefficient b | Standardised coefficient Beta | P-value |
|---|---|---|---|
| Constant | .519 | | .000 |
| Perceived usefulness (H1) | .681 | .689 | .000 |
| Perceived ease of use (H2) | .123 | .116 | .000 |
| Computer self-efficacy (H3) | .128 | .133 | .000 |
| Computer anxiety (H4) | -.038 | -.051 | .041 |

*Dependent variable = Attitude, and R-square = 74.4%*

H2: Perceived ease of use has an impact on attitude towards e-learning materials and technology

H3: Computer self-efficacy has an impact on attitude towards e-learning materials and technology

H4: Computer anxiety has an impact on attitude towards e-learning materials and technology

H5: Perceived usefulness has an impact on actual use of e-learning materials and technology

H6: Perceived ease of use has no impact on actual use of e-learning materials and technology

H7: Computer self-efficacy has no impact on actual use of e-learning materials and technology

H8: Computer anxiety has no impact on actual use of e-learning materials and technology

H9: Attitude has no impact on actual use of e-learning materials and technology

### Barriers and Challenges to e-Learning

1. An investigation was carried out to determine the seriousness of these issues in affecting e-learning in OUM. Learners were asked to rate the issues in terms of seriousness from 1 (Least Serious); 2 (Less Serious), 3 (Neutral), 4 (More Serious) to 5 (Most Serious). The resulting ratings were averaged to provide the mean seriousness index (SI) for each of the 10 issues.
2. As can be observed in Table 13, the mean seriousness (SI) values ranged from 3.3 to 3.5 out of five points, thus signalling the need to reduce or eliminate the impact of these barriers which are considered quite serious by the learner respondents.
3. The top five most serious barriers were under the following categories: (i) technological and academic support; (ii) demand for time and effort; (iii) interface, navigation and platform problems; (iv) awareness of availability of the e-learning materials; and (v) costs of devices and Internet access.

Table 13 Seriousness Index (SI) for barriers to e-learning

| No. | Barrier / Issue | Mean rating |
|---|---|---|
| | Technology and academic support | 3.54 |
| | Time and effort required | 3.50 |
| | Interface, navigation and platform | 3.48 |
| | Awareness of availability of e-learning materials | 3.47 |
| | Costs involved for devices and Internet access | 3.43 |
| | Ease of access | 3.43 |
| | Adequate infrastructure/devices | 3.35 |
| | Reliability of e-learning technology | 3.33 |
| | Language used | 3.33 |
| | Reliability of content of E-learning materials | 3.28 |

## Discussion and Conclusion

1. The study found that OUM learners are generally receptive towards e-learning. This is seen by their low anxiety and positive perceptions for perceived usefulness and ease of use, computer self-efficacy and attitude towards e-learning.
2. With the exception of perceived ease of use, the mean perception ratings for the older learners were in fact higher than the younger 19-29 cohort, suggesting that this group of learners perceived technologies more favourably for e-learning.
3. The learners also reported a reasonably high usage of laptops, and mobile telephones, and a moderate usage of other devices like MP3, MP4 players and tablet computers, for downloading study materials such as HTML modules, iLectures and iRadio learning segments. This is in line with the percentage ownership of the devices. As ownership of specific devices increase, it is most likely that usage of that particular device will increase.
4. There was no significant difference in e-learning usage between older and younger cohorts of learners, a finding that is somewhat different to others reported in the literature (e.g. Czaja & Sharit, 1998; Wagner, Hassanein & Head, 2010).

5. OUM should continue to strengthen its efforts in promoting e-learning through greater and wider use of mobile devices and e-learning technologies such as web-based modules, iRadio, iLectures and online discussion forums among its learners
6. Learners' perceived usefulness and ease of use, computer self-efficacy and anxiety had an impact on attitude towards e-learning ($R^2$ = 74%) These results, which are in line with the TAM model, imply that learners' beliefs and perceptions towards e-learning should be further strengthened to improve their attitude towards using e-learning
7. With regards to usage of e-learning, the regression analysis found that perceived usefulness was the only significant factor, and that the other factors, including attitude, were not significant. These findings strongly suggest the importance of ensuring the usefulness of an e-learning system/environment in order to achieve optimal uptake amongst the learners. In turn, this would require a thorough review of the relevancy and usefulness of the learning content and corresponding technologies to ensure that e-learning can effectively help learners in their studies.
8. The non-significant factors, such as attitude in influencing e-learning usage, suggest that learners in an ODL environment are receptive to using any e-learning tool that is presented to them as long as it is deemed useful for their learning. This perhaps stems from the likelihood that most ODL learners acknowledge the importance of e-learning in achieving educational success, irrespective of their attitude and perceptions towards technology.
9. E-learning barriers: learners rated the 10 common barriers between 3.28-3.54 out of 5.0. This implies that these factors are quite serious. The top five most serious barriers were (i) *technological and academic support*; (ii) *demand for time and effort*; (iii) *interface, navigation and platform problems*; (iv) *awareness of e-learning materials*; and (v) *costs of devices and Internet access*. With regards to these barriers, OUM will have to put in greater effort in making e-learning easy to use and ensuring that it improves learning.
10. The study also found that a section of the learner community had not only

low perceptions towards e-learning but also not using e-learning at all. For the university to move towards ubiquitous e-learning, greater effort should be continued to reduce the impact of e-learning barriers, and to improve the usefulness of e-learning technology for this minority group of learners.

11. Promoting lifelong learning via e-learning among ODL learners can be easier as there appears to be no significant differences in learners' perceptions towards e-learning and actual e-learning usage between the older and younger learner groups.
12. The ODL environment is an appropriate setting for acculturating lifelong learning and it can be made very conducive if: (i) learners themselves take advantage of the e-learning materials and technologies provided by the institution and (ii) the institution take the necessary steps to enhance and improve its e-learning system so that learners find it easy to use and that it is useful in their study.
13. In conclusion, the way forward for OUM is to drive its e-learning to ubiquitous e-learning; enhancing the portability and mobility of learning via appropriate mobile or handheld devices. The enhancers or key requisites are: learner perceptions towards e-learning are high; they are receptive to e-learning and learners are ready for m-learning.
14. In order to move forward, efforts should be directed at creating applications to run on mobile devices, extending existing capabilities as well as exploring new opportunities to enhance the capabilities of mobile devices in delivering its learning materials to learners.

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# Understanding E-learning within context of Social Presence in Adult Education in Latvia

04

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## Abstract

E-learning as a means to promote the changes in academic studies provides the opportunity to integrate non-formal and informal learning elements into formal education. Individualization, flexibility in time and e-environment can facilitate the development of students' competences. The paper deals with the survey on students' perception of e-learning in the context of social presence as a mediating factor to facilitate learning in present society.

The research target group is 100 students (of age 19-54) of an evening school and four higher education institutions in Latvia. The questionnaire of the survey has been designed based on the defined criteria and indicators of the semi-structured literature survey, a grounded theory and identified concepts of a document analysis.

Primary quantitative and qualitative data were obtained by the means of a questionnaire using closed-ended and open-ended questions. The data had been analysed by mathematical statistical data processing methods and the interpretation of the study data had revealed the interconnections among *Teaching Presence, Social Presence and Cognitive Presence.*

*Key words: e-learning, students, higher education, Social Presence, Teaching Presence, Cognitive Presence, challenges, opportunities.*

## Introduction

E-Learning is a new form of learning organisation in the 21st century (Seok, 2008). ICT creates transformative learning environment which provides individual approach and is more suitable for every student's needs (Twigg, 2001). It can help students not only acquire, but also use knowledge, skills and attitude necessary for professional activity (Dwyer, 1999). E-learning has a significant potential to change the nature of the teaching and learning transaction. Seen as part of pedagogical solution, e-learning becomes an opportunity to examine and live up to the ideals of the educational transaction. The current passive-information-transfer approaches to higher education

are contrasted with the interactive and constructive potential of e-learning (Garrison et al., 2003).

The shift in thinking has focused on the internal conditions (attitudes and beliefs) that are necessary for sustained and enduring learning rather than the external surroundings and settings. The educational process should equip students with the attributes and skills for independent learning so that the learner becomes the lecturer and the lecturer the learner (Derrick et al., 2005). Mason's (Mason, 2004) idea to shift from a student-centred approach to a dialogical approach (the student and the educator are learning together) and Fulton's (Fulton, 1998) approach to e-communication as information processing, and learning and cooperation system constructivists' approach (Maslo, 2006) have been integrated and developed in the present study.

Teaching and learning focus must change, placing more emphasis on learners who are able to work independently and autonomously. Educational process should equip students with the attributes for independent learning (Derrick et al., 2005) and develop self-directedness (Gibbons and Phillips, 1984). Computer mediated communication, which supported greater accessibility and adaptability, cognitive engagement and interaction, collaborative work of educators and students is the basis for interactive self-organized learning as a complex process with several interrelated and interacting components (Long, 1990; Boekaerts, 1997).

Therefore it is essential to study how a student turns from the listener and observer into the solver of pedagogical problems, supporter and discussion partner; how the student passes from individual activity to collaboration and learning in a group, from competition to collaboration with peers and to the acceptance of their own and group mates' knowledge by getting included in the group (MacGregor, 1990:25), as well as study mutual interaction among the student, tutor, professor and learning in e-environment. The shift has focused on the internal conditions (attitudes and beliefs) that are necessary for sustained and enduring learning rather than the external surroundings and settings (Derrick et al., 2005).

# 1 The Methodological Framework

Communication in e-environment is closely connected with human experience, including understanding how people behave in creating, exchanging, and interpreting messages. There is "meta-communication", which includes intrapersonal communication, interpersonal communication, and group communication (Aitken, et al, 2008). The ways in which individuals and groups use the technologies of communication — and in some cases are used by them — remain central to what communication occurs.

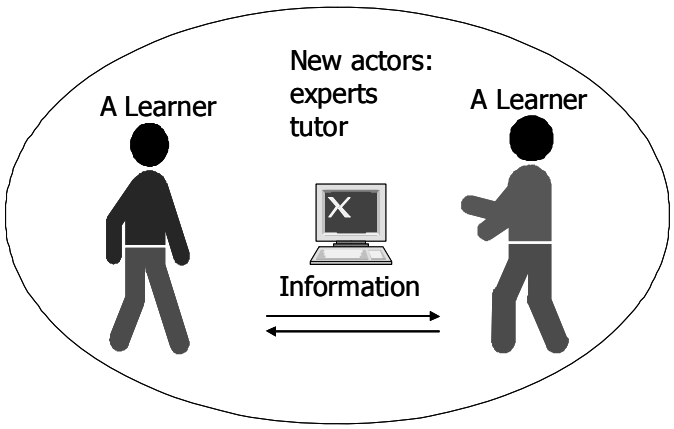


**Figure 1-1** Interaction in E-environment Among Learners, Tutor and Experts

There should be interaction (Figure 1-1): between the learner and other learners, between the learner and the tutor, between the learner and experts to collaborate, participate in shared cognition, form social networks, and establish social presence. Learners should be able to interact within their context to personalize information and construct their own meaning.

Learning and teaching in an online environment are, in many ways, much like teaching and learning in any other formal educational context: learners' needs are assessed;

content is negotiated or prescribed; learning activities are staged; and learning is assessed. However, the pervasive effect of the online medium creates a unique environment for teaching and learning. It is possible to use asynchronous and synchronous communication technologies, as well as the integration of face-to-face and online learning.

The conceptual framework of the present research is based on:

- teaching and learning transaction model (Garrison et al., 2000, 2005);
- systemic – constructivist learning (Reich, 2005);
- connectivism or network learning (Siemens, 2004);
- learning as social practice (Greeno et all, 1996; Mayes & Freitas, 2004).

## 1.1 Teaching and Learning Transaction Model

While human interaction (learner to learner and learner to lecturer) is often stated as a desired instructional goal within distance education, social interaction in and of itself is not a guarantee of cognitive engagement or of meaningful learning (Garrison & Cleveland-Innes, 2005). Randy Garrison and others (Garrison et al., 2000) elaborated the teaching and learning transaction model in a text-based communication medium. The model assumes that in e-community, learning occurs through the interaction of three core components: cognitive presence, teaching presence, and social presence (Garrison et al., 2000). Only the theoretical ideas on the social presence component are considered in this research. Social presence is defined as the ability of participants in the Community of Inquiry to project themselves socially and emotionally, as "real" people (i.e., their full personality), through the medium of communication being used. Randy Garrison et al. (ibid, 2000) based their research on three categories of indicators of social presence which are in line with the research interests of the author of this paper. These categories are emotional expression, open communication and group cohesion.

The first category of social presence indicators is the expression of emotion. The

capacity to express these emotions is correspondingly reduced or eliminated when communication is text-based, and takes place at a distance. In this model, emotional expression is indicated by the ability and confidence to express feelings related to the educational experience.

The second category of indicators of social presence is open communication. It is expressed in open communication in the form of mutual awareness and recognition of each other's contributions. Mutual awareness builds group cohesiveness and helps to shape the learning activities of each participant.

The third category of social presence indicators is group cohesion. This category is exemplified by activities that build and sustain a sense of group commitment which considerably supports and is closely associated with the cognitive aspects of an educational experience. The premise is that critical inquiry and the quality of the discourse are facilitated and optimized when students see themselves as part of a group rather than as individuals. Building cohesion and a sense of belonging are important for sharing personal meaning. This category might be described as focused collaborative communication that builds participation and empathy.

## 1.2 Systemic-constructivist Learning

Kersten Reich (Reich, 2005), the founder of the systemic-constructivist learning approach, analyses the individual's perception of the reality, taking into consideration three dimensions: experience, self-feeling and social recognition (Table 1). These dimensions manifest how different people may be, including their desires and expectations, motivation and physical status, illnesses and physical symptoms, which explain the variety of learners' expectations from the study process. Therefore it becomes an especially significant task to create such a study process, which would provide appropriate learning environment to different people.

**Table 1-1** Dimensions of the Systemic-constructivist Learning (Reich, 2005:21)

| Experience | Self-feeling | Social recognition |
|---|---|---|
| basic emotional experience | wishes | consequences of the surrounding world |
| a pattern of behaviour developed in the motherland | desires | adopting concepts of roles |
| one's own biography as a construction | expectations | adopting social expectations |
| success experienced in learning | motivation | search of one's ideals |
| specific world | physical status | positive and negative patterns |
| cultural peculiarities | illnesses physical symptoms | |

## 1.3 Connectivism or Network Learning

An effective knowledge management system not only provides a vehicle to share information, but also builds a community of learners. George Siemens (Siemens, 2005) offers to use the concept of "connectivism" reasoning that any network is built on the basis of at least two elements: nodes and connections. A node is an element that can be connected to any other element, while a connection is any type of link between them. Once a network has been established, the flow of information can move from one domain to another with relative ease. The stronger the connection between nodes, the more rapidly information will flow. According to Siemens (ibid, 2005), learning is the process that occurs when knowledge is transformed into something of meaning. During this process, learning is the act of encoding and organizing nodes to facilitate data, information, and knowledge flow.

Bobby Elliott (2008) regards connectivism as a new form of e-pedagogy which fosters deep learning, undertaken in collaboration with fellow learners. He argues that connectivism conceptualises knowledge and learning as a network, consisting of nodes and connections. Knowledge, at any point in time, is a particular configuration of

nodes and connections. Learning creates new connections between existing nodes causing changes to existing knowledge, and/or creates new nodes of entirely new knowledge. Learning, therefore, is about network consisting of nodes and connections (Elliott, 2008).

Virtually any element that one can scrutinize or experience can become a node. Thoughts, feelings, interactions with others, and new data and information can be seen as nodes. The aggregation of these nodes results in a network. A community, for example, is a rich learning network of individuals who in themselves are completed learning networks. Nodes are characterized by a general sense of autonomy. A node may exist within a network, even if it is not strongly connected. Each node has the capacity to function in its own manner (Siemens, 2005).

It is important to emphasize that George Siemens (Siemens, 2005) views the emotional, motivating and experiential nodes as network nodes. He defines:

- motivation as an individual's receptiveness to particular concepts as well as the desire to foster deeper network connections;
- emotions as the influencing factors that enact other nodes and apply weighting scales to the network elements. Emotions and how we feel play a large role in how we value nodes and permit the presence of contradictory perspective;
- experience as a catalyst for both acquiring new nodes and forming connections between existing nodes. Experience is also a significant aspect of network creation. A great deal of our learning comes through experience by informal means.

## 1.4 Learning as Social Practice

Learning networks are self-organizing (Siemens, 2005), and very different individuals take part in them which may cause not always foreseen situations in learning process. That is why study process can be considered as well from the situative perspective (learning as social practice) (Greeno, Collins & Resnick, 1996). It also focuses on

learning outcomes that are dependent upon the establishment of collaborative learning outcomes, and on learning relationships with peers. Thus, the situative view emphasises:

- environments of participation in social practices of enquiry and learning;
- support for development of identities as capable and confident learners;
- dialogue that facilitates the development of learning relationships (Mayes, 2004).

All the mentioned theories have been applied in the present research.

# 2 Research Methodology

## 2.1 Research Aim and Question

The evidence based explorative research was conducted during the implementation of study process in previous and current study year (2010/2011) at the University of Latvia to explore the students' perception of e-learning in promoting their studies. The criteria and indicators designed by Randy Garrison, Terri Anderson, and Walter Archer (2000, 2001) for the Community of Inquiry model (CoI), which is an instructional design model for e-learning, were used in the survey. Currently these criteria and indicators are being widely used in the studies in various countries. The quantitative data were considered as a priority in the research.

The aim of the present research was to explore social presence as a mediating factor to facilitate e-learning.

The research question was to find out is there an effect of the social presence on students' e-learning.

## 2.2 Research Sample

The research sample initially comprised 100 students of the higher education institutions studying at the University of Latvia, Riga Teacher Training and Educational Management Academy, Jazeps Vitols Latvian Academy of Music, and Riga Technical University, and Riga Evening School No 18. The group consisted of 87 female and 13 male students of the age from 19 to 54 (see nominal data in Table 2-1).

**Table 2-1** The Nominal Data of Research Sample

| University | Students | Age | Programme | Status |
|---|---|---|---|---|
| University of Latvia | 76 | 47 | Higher education | graduated |
| | | 19-25 | Bachelor study programme | I-III year students |
| | | 20-23 | Professional Bachelor study programme | I-IV year students |
| | | 22-25 | Master study programme | V-VI year students |
| | | 20-34 | Second level higher professional study programme | II-V year students |
| | | 24 | College-level study programme | graduated |
| Jazeps Vitols Latvian Academy of Music | 3 (female) | 23-24 | Bachelor study programme | IV year students |
| Riga Teacher Training and Educational Management Academy | 17 (female-15, male-2) | 54 | Higher education | graduated |
| | | 21-44 | Bachelor study programme | III-IV year students |
| | | 21-34 | Professional Bachelor study programme | III-IV year students |
| | | 23 | Second level higher professional study programme | IV year students |

| | | | | |
|---|---|---|---|---|
| Riga Technical University | 2 (female-1, male-1) | 21-23 | Bachelor study programme | III year students |
| Riga Evening School No 18 | 1 (female-1, male-1) | 25-47 | College-level study programme | I year students |

## 2.3 Research Design

The research has got the design of mixed explorative concurrent quantitative and qualitative methods (Tashakkori, Teddlie, 2003; Taylor, 1973; Dockrell & Hamilton 1983; Altheide & Johnson 1994; Mayring, Huber, Gürtler, 2007) which comprises the following stages: data collection, primary and secondary data processing and finally the analysis and interpretation of findings. The priority has been given to the quantitative aspect of the research. The data have been obtained by the online questionnaire. The research has been conducted in order to study the perceptions of students' use of interactive e-learning as a factor promoting the studies. The questionnaire based on the criteria (categories) and indicators (examples) designed by Garrison, D. R., Anderson, T., and Archer, W. (2000) for the Community of Inquiry

**Table 2-2** Elements of Social, Teaching, and Cognitive Presence (Vaughan and Garrison 2006, 142)

| Elements | Categories | Indicators (Examples only) |
|---|---|---|
| Social Presence | Affective expression | Emoticons |
| | Open communication | Express trust and agreement |
| | Group cohesion | Encourage collaboration |
| Teaching Presence | Design and organization | Defining content and activities |
| | Facilitating discourse | Sharing meaning |
| | Direct instruction | Focusing discussion |
| Cognitive Presence | Triggering event | Sense of puzzlement |
| | Exploration | Information exchange |
| | Integration | Connecting ideas |
| | Resolution | Applying new ideas |

model has been used. The authors have identified social presence (9 items), teaching presence (13 items), and cognitive presence (12 items) as three key elements in effective online teaching and learning. Vaughan and Garrison (2006) have summarized the main categories and examples of each kind of presence (Table 2-2).

The categories of Teaching Presence, Social Presence, and Cognitive Presence have been used as criteria and indicators with more detailed description according Community of Inquiry Survey Instrument. The system of codes has been created (Appendix 3).

## 2.4 The Design of the Questionnaire

To find out students' understanding of e-learning the questionnaire with open-ended and closed-ended items has been constructed. It consists of two parts: general and specific. The general part of the questionnaire consists of 23 items related to the description of the students and their perceptions of e-learning (Table 2-3, Appendix 1). It was based on theoretical background of e-learning, theories of learning and explorative experience of the researchers of the Institute of Pedagogical Sciences (IPS) of the Faculty of Education, Psychology and Art of the University of Latvia (Fernate et al. 2010, 2009; Birzina et al. 2010, 2009; Luka et al. 2009).
The question categories of Table 2－3 were used to explore the students' views concerning e-learning in Latvia and they were used as quantitative and qualitative data to supplement the opinion about Social Presence as a mediating factor to facilitate learning. There was developed code system to be used in general part of the questionnaire (see Appendix 2).

The specific part of the questionnaire consisted of 34 items related to the Community of Inquiry Survey Instrument (see Appendix 3).

Table 2-3 Types of Question Categories in the Questionnaire

| General information | Perceptions on e-learning | Personal meaning |
|---|---|---|
| Sex<br>Age<br>Higher educational institution<br>Study year<br>Study programme<br>Experience of e-learning<br>Computer skills<br>Computer accessibility<br>Internet availability | Conception of e-learning<br>Choice of e-learning<br>Opportunities of e-learning<br>Advantages of e-learning<br>Disadvantages of e-learning | Positive experience<br>Negative experience<br>Help of group-mates<br>Help of lecturer<br>Help to others |
| Codes begin with G_ | Codes begin with E_ | Codes begin with P_ |

## 2.5 The Administration of the Survey

There were several stages in the administration of the survey (Figure 2-1):

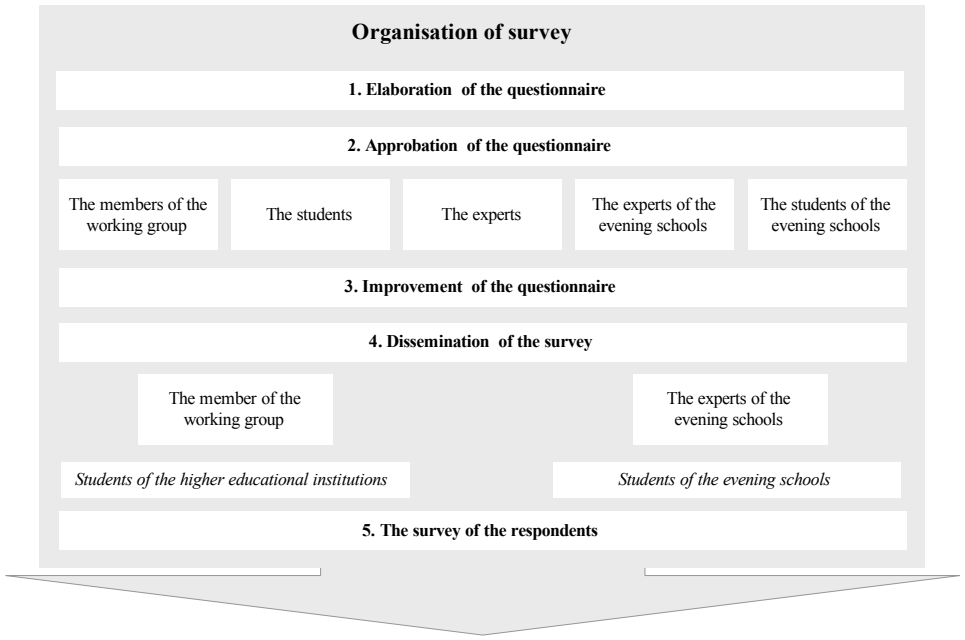


Figure 2-1 The Scheme of Survey Administration

1. The elaboration of the questionnaire.
2. The piloting of the questionnaire.
3. The improvement of the questionnaire.
4. The dissemination of the questionnaire.
5. The survey of the respondents.

### 2.5.1 The Elaboration of the Questionnaire

As the specific part of the questionnaire had been designed based on the criteria and indicators of COL, it was necessary to translate it from English into Latvian. The items were first translated from English into Latvian, and then again from Latvian into English in order to avoid losing the original meaning. Then the questionnaire was uploaded into the Google docs (Figure 2-2) and published on the Internet.


**Figure 2-2** The Questionnaire Published on the Internet*

* Site address: https://docs.google.com/spreadsheet/viewform?hl=en_US&pli=1&formkey=dEVJamJCeWZ4OWo1cHVlVHBJUDBkS1E6MA#gid=0)

### 2.5.2 The Piloting and Improvement of the Questionnaire

There were several steps to pilot the questionnaire. Firstly, the questionnaire had been piloted by 10 working group members. The improvements had been made to the first questionnaire in the general part, specifying the items 1.6 and 1.12. and adding items from 1.18 to 1.23.

Secondly, 12 students of the Doctoral School *Human Capacity and Life Wide Learning in Inclusive Contexts of Diversity* of the University of Latvia had been involved in questionnaire testing and their suggestions concerning questionnaire style had been taken into account. The style of the questionnaire had been made personally more significant. For example:

> was *"1.1. Sex"; "1.2. Your Age"; "1.3. An educational institution"*
> transformed *"1.1. I am (female, male)"; "1.2. I am... years old"; "1.3. I am studying at..."*.

Thirdly, the items of elaborated questionnaire had been discussed with the experts from Spain – Professor Eduardi Ramos Mendez and professor Genoveva Del Carmen Levi Orta from National University of Distance Education. The questionnaire had been demonstrated in the ASEM Education and Research Hub for Lifelong Learning Research Network 5: "ASEM LLL Core Competences" meeting in Riga, Latvia, 7–10 September 2011, as an integrated part of the research project "Identification and Analysis of New Challenges and Solutions That Have Influence on Engagement and Reintegration of Adults (18–24 years) in Learning" funded by ESF project "Support for Education Research" (sub-activity 1.2.2.3.2.) (No. 2011/0011/1DP/1.2.2.3.2/11/IPIA/VIAA/001).

Fourthly, the questionnaire had been piloted with the experts and students of the evening schools of Latvia in the framework of the mentioned project.

### 2.5.3 The Dissemination of the Questionnaire

The dissemination of the questionnaire was organized in the following way: the members of the working group and the experts of the evening schools provided information

about the students; the database of 334 participant records was created and the invitations to participate in the survey via e-mail were sent to them, and the online questionnaire was filled out by the students.

# 3 The Findings of the Research

## 3.1 General Information about Respondents

The sample of pilot study comprised 100 students of the higher educational institutions studying at the University of Latvia, Riga Teacher Training and Educational Management Academy, Jazeps Vitols Latvian Academy of Music, and Riga Technical University, and Riga Evening School No 18.

The respondents' experience of e-learning (see Table 3-1) was not very rich – 25% of the students had previous experience in e-learning (three years and more), 27% – two years, 17% – one year, and 11% – less than one year. 20% of the respondents hadn't had any e-learning experience.

**Table 3-1** The Students' Experience of E-learning

| Code | Rating scale | (%) |
|---|---|---|
| G_EXP_1 | Less than one year | 11 |
| G_EXP_2 | One year | 17 |
| G_EXP_3 | Two years | 27 |
| G_EXP_4 | Three years and more | 25 |
| G_EXP_5 | No experience at all | 20 |
| | Total | 100 |

G_EXP_OTH OTHER – *periodically, it is difficult to determine a specific time*

In the next question the students were asked to evaluate their computer skills in five-point system, and their answers ranged in the following way: 17% of them assessed their computer skills as excellent, 61% – good, and 22% – satisfactory (Table 3-2). Evaluating the impact of their computer skills on e-learning, 26% of students considered that their computer skills totally did not influence their e-learning process, 22% felt almost no impact, 23 % were neutral about this question, 17% felt some impact, and 11% experienced strong impact.

**Table 3-2** ICT Skills and Their Impact on Students' E-learning

| My computer skills are | | | My computer skills has got impact on my e-learning | | |
|---|---|---|---|---|---|
| Code | Rating scale | (%) | Code | Rating scale | (%) |
| G_ICTSK_1 | 1 – very poor | 0 | E_ICTSKEf_1 | 1 – strong impact | 11 |
| G_ICTSK_2 | 2 – poor | 0 | E_ICTSKEf_2 | 2 – some impact | 17 |
| G_ICTSK_3 | 3 – satisfactory | 22 | E_ICTSKEf_3 | 3 – neutral impact | 23 |
| G_ICTSK_4 | 4 – good | 61 | E_ICTSKEf_4 | 4 – almost no impact | 22 |
| G_ICTSK_5 | 5 – excellent | 17 | E_ICTSKEf_5 | 5 – no impact at all | 26 |
| | No answer | 0 | | No answer | 1 |
| | | 100 | | | 100 |

As to the availability of computers, 79% of respondents had free access to them, the computers were almost available to 13% of respondents, 4% could not specify it, and 3% had stated that computers were completely inaccessible to them (no answer – 1%). 26% of respondents evaluated their Internet connection as very fast, 40% as nearly fast, 28% – medium fast, 2% – nearly slow, and 3% of the respondents – very slow (no answer – 1%).

## 3.2 The Findings on the Respondents' E-learning Perception

The findings of the study concerning e-learning perception revealed that the following factors had determined the respondents' choice of e-learning (Table 3-3):

**Table 3-3** Students' Choice of E-learning

| Attitudes scale / Code / Answer of Respondents (%) | E_OPT_FT | E_OPT_WL | E_OPT_AB | E_OPT_PL | E_OPT_NoL | E_OPT_DISC | E_OPT_RES | E_OPT_CHAL |
|---|---|---|---|---|---|---|---|---|
| 5-strongly agree | 47 | 45 | 30 | 40 | 23 | 10 | 23 | 24 |
| 4-agree | 32 | 22 | 12 | 28 | 25 | 19 | 37 | 28 |
| 3-neither disagree nor agree | 7 | 15 | 18 | 16 | 17 | 26 | 23 | 24 |
| 2-disagree | 6 | 6 | 11 | 5 | 8 | 22 | 8 | 12 |
| 1-strongly disagree | 4 | 9 | 24 | 6 | 22 | 20 | 5 | 8 |
| No answer | 4 | 3 | 5 | 5 | 5 | 3 | 4 | 4 |

* Interpretation of codes used

| | |
|---|---|
| E_OPT_FT | I can learn individually at my own time |
| E_OPT_WL | I can work and study |
| E_OPT_AB | I can live and work in another country, but study in Latvia |
| E_OPT_PL | I can plan my own study time |
| E_OPT_NoL | I can communicate online, so lesson attendance is not compulsory |
| E_OPT_DISC | I can discuss things with course mates |
| E_OPT_RES | I can choose learning resources and learn according to my needs and abilities |
| E_OPT_CHAL | I can learn new knowledge, develop skills and competence working in previously unknown situations |

Most of the students gave preference to e-learning because of learning autonomously (strongly agreed – 47% and agreed – 32%), flexibly combining studies with work (strongly agreed – 45% and agreed – 22%), planning personal time (strongly agreed – 40% and agreed – 28%), choosing learning resources and learning according to one's own needs and abilities (strongly agreed – 23%, agreed – 37% and neither disagreed nor agreed – 23%).

It was interesting that many respondents considered e-learning as a challenge for them (strongly agreed – 24%, agreed – 28% and neither disagreed nor agreed – 24%). Less attention was paid to communication and discussions with course mates (strongly agreed – 23%, agreed – 25%, and strongly disagreed – 22%).

Concerning the disadvantages of e-learning, the students as important had mentioned (Table 3-4) a lack of online communication and experiencing the feeling of loneliness

(very often – 49%, often – 20%, sometimes – 13%), lecturer's consultations (often – 21%, very often – 12%) and group work (sometimes – 13%, often – 16%).

**Table 3-4** Students' Opinion on What They Missed in E-learning

| Attitudes scale / Code Answer of Respondents (%) | E_MIN_COM | E_MIN_TIME | E_LIKE_COMP | E_LIKE_ORG | E_MIN_COOP | E_MIN_INTERACT | E_MIN_HELP | E_MIN_GROUP_ACT | E_MIN_ICTSK |
|---|---|---|---|---|---|---|---|---|---|
| 5-strongly agree | 7 | 6 | 15 | 4 | 7 | 4 | 12 | 8 | 4 |
| 4-agree | 2 | 22 | 14 | 18 | 18 | 10 | 21 | 16 | 5 |
| 3-neither disagree nor agree | 13 | 32 | 30 | 32 | 27 | 30 | 28 | 13 | 27 |
| 2-disagree | 20 | 13 | 20 | 19 | 13 | 17 | 9 | 21 | 21 |
| 1-strongly disagree | 49 | 17 | 10 | 17 | 26 | 30 | 21 | 31 | 34 |
| No answer | 9 | 10 | 11 | 10 | 9 | 9 | 9 | 11 | 9 |

* Interpretation of codes used

| | |
|---|---|
| E_MIN_COM | Online communication, so there is the feeling of loneliness |
| E_MIN_TIME | Time planning skills (I am losing time looking for problem solutions alone) |
| E_MIN_COMP | Possibility to carry out the activities I am interested in |
| E_MIN_ORG | Clear procedure and regulations of course organization |
| E_MIN_COOP | Cooperation with other students |
| E_MIN_INTERACT | Interaction in virtual communication and online forums |
| E_MIN_HELP | Lecturer's consultations |
| E_MIN_GROUP_ACT | Group work |
| E_MIN_ICTSK | ICT knowledge and skills |

Summarizing the data, it can be seen that the respondents had not mentioned the problems of interaction and communication with course mates and the loss of the learning time if e-learning had been organised as their individual work. The issues of communication were more sensitive question in e-learning. The positive side was that the ICT knowledge and skills had not been a barrier in e-learning. The respondents had also recognized the gaps of the technical capacity of MOODLE. According to respondents, the organisation of the e-learning and lecturer's role were significant factors for the successful e-learning process and progress. It could be

confirmed by the quotations from students' responses, for example:

> *E-learning is a good help and support in order to attend a study course and study autonomously for people who have tight schedules and not enough time for studies.*

**Table 3-5** Reveals students' answers concerning their likes in e-learning.

**Table 3-5** Students' Opinion on What They Liked in E-learning

| Attitudes scale / Code Answer of Respondents (%) | E_LIKE_EXP | E_LIKE_CCOM | E_LIKE_LCOM | E_LIKE_VPCOM | E_LIKE_COMPETENCE | E_LIKE_ICT |
|---|---|---|---|---|---|---|
| 5-strongly agree | 21 | 11 | 12 | 8 | 16 | 21 |
| 4-agree | 28 | 18 | 21 | 15 | 39 | 28 |
| 3-neither disagree nor agree | 25 | 23 | 25 | 19 | 17 | 21 |
| 2-disagree | 11 | 7 | 12 | 20 | 10 | 9 |
| 1-strongly disagree | 7 | 33 | 21 | 30 | 10 | 12 |
| No answer | 8 | 8 | 9 | 8 | 8 | 9 |

*Interpretation of codes used

| | |
|---|---|
| E_LIKE_EXP | Get new learning experience |
| E_LIKE_CCOM | Get in contact and discuss things with course mates |
| E_LIKE_LCOM | Get in touch and consultations with lecturers |
| E_LIKE_VPCOM | Get different course members' views and change my opinion |
| E_LIKE_COMPETENCE | Develop my learning competencies |
| E_LIKE_ICT | Improve my ICT knowledge and skills |

To sum up, the main aspects which attracted students to e-learning were the possibility to develop their learning competencies (strongly agreed – 16%, agreed – 39%), get new learning experience (strongly agreed – 21%, agreed – 28%) and improve their ICT knowledge and skills (strongly agreed – 21%, agreed – 28%). The communication on e-platform was also important, but it was more significant regarding the communication with lecturers instead of the communication among students.

According to the data of Table 3-6, the students take e-learning courses to use different learning resources.

**Table 3-6** Students' Use of Different Kinds of E-resources

| Attitudes scale / Code Answer of Respondents (%) | LECT | DYNAMIC | CAL | VIDEO | VIDEO_LIV | TASK | CHECK | TEST | DISC | FOR | CHAT | QUEST | COM_T | COM_ST |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5-strongly agree | 32 | 9 | 2 | 0 | 1 | 11 | 10 | 12 | 5 | 8 | 9 | 3 | 10 | 19 |
| 4-agree | 32 | 17 | 12 | 3 | 1 | 21 | 22 | 25 | 4 | 7 | 4 | 6 | 19 | 16 |
| 3-neither disagree nor agree | 22 | 28 | 25 | 4 | 2 | 34 | 29 | 25 | 12 | 15 | 13 | 19 | 27 | 15 |
| 2-disagree | 5 | 18 | 22 | 7 | 7 | 17 | 15 | 17 | 11 | 14 | 9 | 30 | 17 | 11 |
| 1-strongly disagree | 4 | 22 | 33 | 80 | 82 | 11 | 17 | 15 | 60 | 50 | 58 | 35 | 21 | 32 |
| No answer | 5 | 6 | 6 | 6 | 7 | 6 | 7 | 6 | 8 | 6 | 7 | 7 | 6 | 7 |

*Interpretation of codes used

| | |
|---|---|
| E_R_LECT | Lecture materials (text format, images and other static information) |
| E_R_DYNAMIC | Lecture materials supplemented by dynamic information (videos, demos, etc.). |
| E_R_CAL | Interactive learning materials including self-assessed training (learning) |
| E_R_VIDEO | The videos of lectures |
| E_R_VIDEO_LIV | Live lectures online |
| E_R_TASK | Exercises and tasks for knowledge acquisition |
| E_R_CHECK | Check-up works |
| E_R_TEST | Tests |
| E_R_DISC | Free discussions |
| E_R_FOR | Course forums on specific topics |
| E_R_CHAT | Chats |
| E_R_QUEST | Polls |
| E_R_COM_T | Communication with lecturers |
| E_R_COM_ST | Communication with other students |

Lecture materials (text format, images and other static information), sometimes videos, demos, and interactive learning materials including self-assessed learning had been most used by students. Of course, in e-learning there had been also used tests, polls and exercises and tasks, also check-up works. The least used there had been free discussions, course forums on specific topics, and chats and even less than that the videos of lectures and live lectures online (the highest rating "never" – 80 –

82%). The same problematical issue were the communication: communication among students had been never used (32%) and communication with the lecturer (never – 21%), but at the same time more students had believed that for them was important to communicate with course mates (very often – 19%) and the lecturer (very often – 10%). This was confirmed by the quotations from students' responses:

> *We have access to e-learning materials only and forums, most of the lectures we have to attend face to face. Several of these options are not available (like videos), but it would be very useful in learning and repeating – there are cases where we cannot come to lectures (a disease, a conference / study visits, urgent work), but the lecture materials for a number of university lectures are not published.*
>
> *I think the lecturers in nature sciences at the University of Latvia have not developed the environment for e-studies, because majority of actions cannot be performed virtually, you need to do practical laboratory work and study in the classroom, maybe it only works in subjects of sociology and psychology.*
>
> *I use the e-environment only as an additional site for lecture materials, some additional materials, which are unique and which are not dealt with during the lecture, course descriptions and sometimes for tests or assignments. I do not need to discuss it in the e-environment; I can ask all issues to lecturer during the consultation.*

## 3.3 The Findings of the Respondents' Personally Significant Position

The obtained data of (P_PREV_EXP_POS) on the positive previous learning experience reveal its influence on students' e-learning:

### 1. Positive and negative attitudes to e-learning

Quotation of respondents' answers:

*I like to work on my computer; it helps me to prepare for lessons.*

*I positively evaluated opportunities to examine my knowledge through tests, exercises and other examination forms.*

*MOODLE is very easy. In the evening, relaxing at home with warm cup of tea I can see the written papers of other students and make comment on them.*

*E-learning has affected my study work a lot because so far all studies have been face to face lectures. The existing e-learning is not focused on distance learning because it contains a lot of information, which will require explanation and the comments of lecturers.*

*I haven't got a complete e-learning experience. I had not used e-learning at school yet, I have not heard about e-learning at the university.*

*I am interested in e-learning because it has only started at university, so I had not had any previous experience.*

*It is better to learn in face to face lectures.*

*E-learning is not as highly developed in the higher education so that I should be pleased.*

*No impact. I do not like e-learning especially.*

**2. Knowledge of use of computers, applications, and Internet**

Quotation of students' answers:

*It is much easier search the information on the Internet, as there is a combination of Ctrl + F, which makes it possible to find quickly and accurately.*

*My acquired skills to use the computer at school have already given the knowledge which is necessary for finding information within e-environment.*

*I had been using e-class in the secondary school and there I acquired the first skills to learn virtually.*

**3. Positive experience and good practice**

Quotation of respondents' answers:

*My positive previous experience helps to better learn / use the new e-learning ways to have a positive attitude towards e-learning.*

*Studying informatics at school I learned quite well how to work in Microsoft Word and Excel.*

*I have studied the subject Informatics at school from Grade 4, where I was introduced to computer technology and all necessary programs. Similarly, the school provided access to the Internet.*

*Before studies at the University, I have been using a very primitive e-learning, for example, google.lv.*

*E-learning Institutional Shield is a good example of how this (e-learning) could be done.*

*I can interact with people and develop my abilities.*

*E-learning is very convenient if you have access to lecture synopsis.*

*I liked that I could find the lecture material at any time.*

*I was able to plan my free time (after lessons) at school, also now I can independently choose my own learning pace.*

*Lectures of lecturer (Riga Teacher Training and Educational Management Academy) – a good practice: she has got an excellent lecture course of children's language and philosophy. The lecturer was able to combine full-time students of Riga with part-time students of Cesis – studies were interesting, creative and fruitful.*

### 4. Opportunities offered by e-learning

Quotation of respondents' answers:

*It was possible to prepare theoretically for the next lecture through the use of e-learning, thus it economized the time allowed for discussion, practical work, etc. I could understand what was written in the synopsis of a lecture, if I had listened to the lecture.*

*It gives me an independent organization and time management.*

*There are understandable and easily available materials on various subjects on the Internet.*

*Yes, I found that the e-environment offered great materials, as well as I did need to visit the library to find that – everything could happen at home.*

*I can submit homework and perform the tests.*

*Freely available information, any time you want it!*

*There is an opportunity to learn without interruption, at any place and at any time.*

Respondents' perceptions of previous negative learning experiences that influenced e-learning were analysed in (P_PREV_EXP_NEG). They had mentioned:

**1. Problems of language**

Quotation of respondents' answers:

*At secondary school I had lessons of informatics not in the official language, but Russian. It caused me problems acquiring computer skills.*

**2. Technical problems**

Quotation of respondents' answers:

*If something happens to the system, it does not have access to, and it is not possible to prepare for a lesson, lecture.*

*Learn from our mistakes – it helps to prevent any logical or technological accidents. Any loss of data leads to say "Again".*

*Internet does not always work.*

**3. Communication problems**

Quotation of respondents' answers:

*The participants of social networks and chats may not always agree on a common. It happens that all are not always participating in the discussion.*

*Unresponsiveness.*

*Lecturer has too much confidence in e-environment, loss of contact with*

*students as person.*

*I prefer if the identified errors are commented in face to face learning.*

*Not everything is available and understandable; it is not always enough with e-communication environment, sometimes we need to talk "face to face."*

*Sometimes the lecturer does not respond to questions in e-environment.*

*In particular, we do not use a lot of communication with lecturers and search of information in forums.*

*I do not like that, sometimes, I lack information on the time devoted to test performance.*

*Misunderstanding of problems which occur when working independently.*

**4. Experience**

Quotation of respondents' answers:

*I do not have negative learning experience that affects e-learning. I do not have any experience in e-learning.*

*I did not have e-learning at school; therefore, I could not find out news and changes in school life.*

*Previous test performance helped me to perform tasks without thinking about how to do that.*

**5. Information literacy**

Quotation of respondents' answers:

*It happens that the common information on the Internet is incorrect.*

*Sometimes the information found in e-environment cannot be fully trusted.*

**6. ICT skills**

Quotation of respondents' answers:

*Slightly weak computer skills.*

**7. Suggestions**

Quotation of respondents' answers:

> *I think this experience of e-learning should start at school. At school, this type of learning is not popular, so we have difficulties at work.*

The respondents' answers to (P_HELP_GMATES_TEACH) about giving and receiving help in e-learning revealed that they had chosen the following areas:

**1. Lack of own knowledge**

Quotation of respondents' answers:

> *I have not really helped because I haven't got enough knowledge to help someone understand what I myself still do not understand.*

**2. Good practice**

Quotation of respondents' answers:

> *I helped to find the necessary information. I have helped to find the necessary lecture materials.*
>
> *I provided answers to uncertain questions. I helped to fulfil various tasks.*
>
> *I helped telling other group-mates, how to make homework and find an interesting web link, which would help their learning.*
>
> *I took part in group work primarily or sent those works that could be used as examples.*
>
> *I gave samples for laboratory work. I told how to find and use interactive discs, as many of my group-mates had not even heard about.*

**3. Solving problems by communication**

Quotation of respondents' answers:

> *Perhaps only with sharing teaching materials.*
>
> *I helped to understand some incomprehensible matter via the course forum,*

*thus sharing my views.*

*I was participating in group work, working together on a project.*

*Quite often I have advised or explained a complicated question (via email and portal Draugiem).*

*I have been involved in Chat to discuss various issues.*

*I could explain my group-mate where to find teaching materials for a given e-study course.*

*I informed of updates, changes in e-study course.*

*When I find exactly what my classmates need, I send it, and it can be easily and quickly done. Similarly, in the e-learning environment I can help a course mate in the examination.*

**3. Technical help**

Quotation of respondents' answers:

*Yes, I have helped to understand the technology, the program logics.*

*I've helped those who lacked knowledge on use of application and Computer Science.*

**4. No experience**

Quotation of respondents' answers:

*I do not have any experience in e-learning.*

The analysis of (P_HELP_GMATES_REC) concerning receiving the help from class-mates or lecturer in e-learning revealed that students' perceptions varied:

**1. How lecturers helped me**

Quotation of respondents' answers:

*When I asked questions, a lecturer could answer, and thus help me.*

*Yes, I have received assistance to cope with the program or technology, such as explaining the activity in MOODLE.*

*I got answers to uncertain questions by the help of my lecturer.*

*Professor sent me samples of the task. Her comments and suggestions were useful for correction.*

*Lecturers are very responsive and generally respond to emails and send us the annexes of the study material. It is also used course e-mail where the necessary files are uploaded and materials stored.*

*Sending lecturer homework I get answers on how to improve them.*

*I am getting advice for completing tasks.*

*All information is in an electronic form, there is no need to go to lectures and write it down. Video can be saved and then played.*

**2. How group-mates helped me**

Quotation of respondents' answers:

*I did not understand the electronic submission procedure, group-mates helped me.*

*I discussed together with classmates the various issues in Chat.*

*I take part in group work.*

**3. How the students were studying themselves**

Quotation of respondents' answers:

*I learned how to work with the materials, how to manage my profile.*

*I learned how to properly comply with the tasks assigned and how to enter and pass the assessment.*

*I used the lecture synopsis, which was supplemented by a dynamic information and control tests. The developed material was prepared in a transparent and understandable manner, therefore, classmates or lecturer's help was not needed.*

*Frequently, I would like to contact and ask questions directly via e-mail.*

Students' perceptions about advantages of e-learning (P_ADVANTAGE) compared

to other forms of educational techniques were:

**1. General views**

Quotation of respondents' answers:

*Everything nowadays is linked with the e-environment. ICT helps me to successfully cope with various difficulties.*

*It allows you to save time as well as using technologies is easier to operate and it is good for training purposes. Distance learning is an ideal option to combine the studies with work.*

*It is diversification of the learning experience through multimedia.*

**2. Time and site management**

Quotation of respondents' answers:

*It is an economy of time and time management – learning and work, etc., activities, choosing the most desirable time. There are advantages, as goods become more dynamic, hence the use of new methods for the student is a challenge.*

*I can freely choose the most appropriate time to learn. I can learn to read, analyze, and reflect quietly on lesson material at home. It is possible to comply with tests and read the theory in any site of the world.*

*The main advantage would be that anytime and anywhere it can be used. You can study even at night!*

**3. Effectiveness of technologies**

Quotation of respondents' answers:

*It is a possibility to work anywhere you have an Internet connection.*

*E-learning saves travel costs and time taken by traditional students spent travelling to educational institutions.*

**4. Attitude and challenge**

Quotation of respondents' answers:

*It is advantage if you like to work on computer.*

*Is! It is definitely, because both the time and the equipment changes. And if a man has been able to be so creative and develop the technology, it should also be used. Or as they say – if you are given then take, if you are able, and then fly! Students must be able to take more!*

*It means communicating from a distance, sharing documents, using printed material – to live green.*

*The advantage is only for those who are too lazy to attend lectures!*

*It develops competence of self-learning and self-organization, as well as provides opportunities for personal time management and flexibility.*

*Improving computer literacy and skills.*

To conclude the data obtained showed the main advantages were: the students' own time planning, an opportunity to combine studies with work and the challenge for the development.

As concerns the disadvantages of e-learning (P_DISADVANTAGE) the students mentioned:

**1. General views**

Quotation of respondents' answers:

*Partly, it is a way to access the mind of the other party, but not for all, it works.*

*I think that would not be bad if the e-course was at primary school where students could be confronted with the possibility to learn in an e-learning environment. Not completely, but as an experiment for seventh or eighth grade will not be bad. Youth has already spent a lot of time at the computer, so why exclude the possibility of a way to learn the subject matter?*

*The computerized environment easily distracts from learning and it is difficult to read the information received, it is time consuming, but it can be faster because you can skip the "known" themes.*

*It is an important technical support, limited work with paper books, limited "live" contact among people.*

**2. The role of communication**

Quotation of respondents' answers:

*Learn only from the e-learning course – it means to understand the meaning, not all information which is presented in face to face lecture.*

*If this is the only way of learning, it can only be appropriate to start at secondary school because children need direct communication.*

*There is a lack of direct contact with people. Non-verbal language, gestures, facial expressions are not used in talking and learning. I think it is very important to feel a live person next to you. Interacting on the Internet is not the same as physical contact. E-learning does not include direct contact with lecturers.*

*There is a lack of reality and there is no direct contact with the lecturer.*

*Information may be inaccurate, or is likely to be interpreted incorrectly.*

*Lack of the opportunity to discuss important issues face to face with the lecturer, sometimes it is better understood than communicating electronically.*

*There is missing discussion and an exchange of views in e-environment.*

*Virtual communication cannot replace real communication and conversations.*

*Lack of "contact" with people, it creates confusion to learn subject on one's own.*

*We have more opportunities to discuss with lecturers and group-mates in face to face lecture. We have the opportunity to ask questions when something is not clear before going on to the next topic or the next thought. It is not possible in e-environment.*

*There is no physical communication, group work, a sense of lack of time.*

**3. The organisation of e-studies**

Quotation of respondents' answers:

*There are too many uncertainties; I hope they will improve in practice.*

*Prerequisites are needed because not everyone is able to pace one's learning and use the e-environment.*

*The main disadvantage is that the lecture materials are not available in the*

*e-environment, or some of them have got inadequately poor quality and are not totally comparable to the books, lecturer's lectures, etc.*

*Materials are not available to all.*

*The study materials are available for quite a few courses. And if so, they are incomplete.*

*Many lecturers do not put own lecture synopsis in the e-environment.*

*I cannot get the right answer to my question from the lecturer.*

*The students receive information more slowly because not all of them visit the e-environment so often. Sometimes, just missing certain information, but that issue is not technology, it is a question of human factor.*

*Many lecturers are not ready for e-learning as much as would like.*

*Asking a lecturer via e-environment it takes more time to get the desired response. Have to better define the components and cannot always do it.*

*Ideally, e-learning would be using a combination of lectures and practical works; otherwise we lose contact with the lecturer. School environment is also motivating and makes students work.*

**4. Technical problems**

Quotation of respondents' answers:

*Lack of personal contact, loss of time due to technical reasons.*

*Sometimes there is a problem with the Internet.*

*If there is no chance to be at the computer, then it makes e-learning process difficult. Not always and not everyone has access to the Internet to get access to study materials.*

*It is necessary to buy more powerful computers.*

*Due to the lack of computer or electricity, and the Internet direct communication is sometimes not possible.*

**5. Attitudes**

Quotation of respondents' answers:

*For those who do not like computers, they do not quite enjoy e-learning.*

*Perhaps for people who do not have a strong will power or desire to learn something, e-learning is not appropriate.*

*It is important to promote students' motivation.*

*Many lecturers are not ready for e-learning as much as they should be and would like to be.*

*It "helps" people with psychological complexes to activate themselves.*

*It is possible to cheat in exams can cheat, there is no direct reflection of knowledge, and there are frequent options for copy - paste.*

**6. Health problems**

Quotation of respondents' answers:

*Due to sitting long at the computer, my eyes and back hurt.*

## 3.4 The Findings of Respondents' Social Presence as Mediator in E-learning

The data of Teaching Presence (Table 3-7) will be analysed within three criteria (Design and Organization, Facilitating Discourse and Direct Instruction) which reveal the items mainly linked with the actions of the lecturer.

### 3.4.1 Teaching Presence

**1. Criteria: Design and Organization**

(TP_DO_TOP) The lecturer clearly communicated important course topics (strongly agreed − 32%, agreed − 41%, neither agreed nor disagreed − 16%, disagreed − 1%, strongly disagreed − 1%, no answer − 9%).

(TP_DO_GOAL) The lecturer clearly communicated important course goals (strongly agreed − 33%, agreed − 45%, neither agreed nor disagreed − 10%, disagreed − 1%, strongly disagreed − 2%, no answer − 9%).

(TP_DO_ACT) The lecturer provided clear instructions on how to participate in course learning activities (strongly agreed − 27%, agreed − 34%, neither agreed nor disagreed − 19%, disagreed − 10%, strongly disagreed − 2%, no answer − 8%).

(TP_DO_TIME) The lecturer clearly communicated important deadlines for learning activities (strongly agreed − 33%, agreed − 32%, neither agreed nor disagreed − 19%, disagreed − 3%, strongly disagreed − 4%, no answer − 9%).

In summarizing the data we can say that majority of students considered that the lecturer had clearly communicated important course topics and important course goals, as well he/she had provided clear instructions on how to participate in course learning activities, and the course schedule was clear for them.

**2. Criteria: Facilitation**

(TP_FACIL_AGR) The lecturer was helpful in identifying the areas of agreement and disagreement on course topics that helped me to learn (strongly agreed −15%, agreed − 22%, neither agreed nor disagreed − 35%, disagreed − 12%, strongly disagreed − 8%, no answer − 8%).

(TP_FACIL_QUID) The lecturer was helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking (strongly agreed − 13%, agreed − 26%, neither agreed nor disagreed − 32%, disagreed −13%, strongly disagreed − 7%, no answer − 9%).

(TP_FACIL_ENG) The lecturer helped to keep course participants engaged and participate in productive dialogue (strongly agreed − 13%, agreed − 16%, neither agreed nor disagreed − 36%, disagreed − 15%, strongly disagreed − 10%, no answer − 10%).

(TP_FACIL_LERN) The lecturer helped keep the course participants on task in a way that helped me to learn (strongly agreed − 14%, agreed − 18%, neither agreed nor disagreed − 34%, disagreed − 11%, strongly disagreed − 13%, no answer − 10%).

(TP_FACIL_CONC) The lecturer encouraged course participants to explore new concepts in this course (strongly agreed − 13%, agreed − 24%, neither agreed nor

**Table 3-7** The Students' Perception on Teaching Presence

| Criteria | Design & Organization | | | | Facilitation | | | | | | Direct Instruction | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Attitudes scale / Code Answer of Respondents (%) | TP_DO_TOP | TP_DO_GOAL | TP_DO_ACT | TP_DO_TIME | TP_FACIL_AGR | TP_FACIL_QUID | TP_FACIL_ENG | TP_FACIL_LERN | TP_FACIL_CONC | TP_FACIL_COM | TP_DI_FOCUS | TP_DI_FEED | TP_DI_HELP |
| 5-strongly agree | 32 | 33 | 27 | 33 | 15 | 13 | 13 | 14 | 13 | 11 | 15 | 17 | 11 |
| 4-agree | 41 | 45 | 34 | 32 | 22 | 26 | 16 | 18 | 24 | 16 | 15 | 21 | 21 |
| 3-neither disagree nor agree | 16 | 10 | 19 | 19 | 35 | 32 | 36 | 34 | 33 | 31 | 32 | 29 | 33 |
| 2-disagree | 1 | 1 | 10 | 3 | 12 | 13 | 15 | 11 | 10 | 17 | 13 | 11 | 11 |
| 1-strongly disagree | 1 | 2 | 2 | 4 | 8 | 7 | 10 | 13 | 10 | 14 | 15 | 11 | 13 |
| No answer | 9 | 9 | 8 | 9 | 8 | 9 | 10 | 10 | 10 | 11 | 10 | 11 | 11 |

*Interpretation of codes used

TP_DO_TOP The lecturer clearly communicated important course topics.

TP_DO_GOAL The lecturer clearly communicated important course goals.

TP_DO_ACT The lecturer provided clear instructions on how to participate in course learning activities.

TP_DO_TIME The lecturer clearly communicated important deadlines for learning activities.

TP_FACIL_AGR The lecturer was helpful in identifying the areas of agreement and disagreement on course topics that helped me to learn.

TP_FACIL_QUID The lecturer was helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking.

TP_FACIL_ENG The lecturer helped to keep course participants engaged and participate in productive dialogue.

TP_FACIL_LERN The lecturer helped to keep the course participants on task in a way that helped me to learn.

TP_FACIL_CONC The lecturer encouraged course participants to explore new concepts in this course.

TP_FACIL_COM Lecturer's actions reinforced the development of a sense of community among course participants.

TP_DI_FOCUS The lecturer helped to focus discussion on relevant issues in a way that helped me to learn.

TP_DI_FEED The lecturer provided feedback that helped me understand my strengths and weaknesses.

TP_DI_HELP The lecturer provided feedback in a good time.

disagreed − 33%, disagreed − 10%, strongly disagreed − 10%, no answer − 10%).

(TP_FACIL_COM) Lecturer's actions reinforced the development of a sense of community among course participants (strongly agreed − 14%, agreed − 17%, neither agreed nor disagreed − 31%, disagreed − 17%, strongly disagreed − 14%, no answer − 11%).

Summarizing the obtained data, it could be concluded that the facilitating activities of the lecturer had been less appreciated; therefore, their improvement should be seriously considered during e-courses.

**3. Criteria: Direct instruction**

(TP_DI_FOCUS) The lecturer helped to focus discussion on relevant issues in a way that helped me to learn (strongly agreed − 15%, agreed − 15%, neither agreed nor disagreed − 32%, disagreed − 13%, strongly disagreed − 15%, no answer − 10%).

(TP_DI_FEED) The lecturer provided feedback that helped me understand my strengths and weaknesses (strongly agreed − 17%, agreed − 21%, neither agreed nor disagreed − 29%, disagreed − 11%, strongly disagreed − 11%, no answer − 11%).

(TP_DI_HELP) The lecturer provided feedback in a good time (strongly agreed − 11%, agreed − 21%, neither agreed nor disagreed − 33%, disagreed − 11%, strongly disagreed − 13%, no answer − 11%).

Summarising the data, feedback giving could be considered more by lecturers because the highest percentage of answers was in the rating scale "neither disagree nor agree".

### 3.4.2 Social Presence

Table 3-8 on students' perception on Social Presence will be analysed within three criteria, which reveal items linked with the collaboration between the lecturer and the students and among the students.

**1. Criteria: Affective expression**

(SP_AE_KNOW) Getting to know other course participants gave me a sense of be-

longing to the course (strongly agreed − 28%, agreed − 11%, neither agreed nor disagreed − 26%, disagreed − 15%, strongly disagreed − 8%, no answer − 12%).

(SP_AE_IMPR) I was able to form distinct impression of some course participants (strongly agreed − 5%, agreed − 16%, neither agreed nor disagreed − 22%, disagreed − 18%, strongly disagreed − 27%, no answer − 12%).

(SP_AE_COM) Online or web-based communication is an excellent medium for social interaction (strongly agreed − 13%, agreed − 20%, neither agreed nor disagreed − 25%, disagreed − 18%, strongly disagreed − 20%, no answer − 13%).

According to the data, majority of the respondents were in the neutral position and strongly agreed concerning a sense of belonging to the course, but they strongly disagreed they knew their course mates and the course gave distinct impressions of them. They also did not quite agree online or web-based communication was an excellent medium for social interaction.

**2. Criteria: Open communication**

(SP_OC_COM) I felt comfortable communicating through the online medium (strongly agreed − 10%, agreed − 19%, neither agreed nor disagreed − 30%, disagreed − 15%, strongly disagreed − 13%, no answer − 13%).

(SP_OC_DISC) I felt comfortable participating in the course discussions (strongly agreed − 9%, agreed − 20%, neither agreed nor disagreed − 33%, disagreed − 12%, strongly disagreed − 13%, no answer − 13%).

(SP_OC_ACT) I felt comfortable interacting with other course participants (strongly agreed − 10%, agreed − 22%, neither agreed nor disagreed − 30%, disagreed − 12%, strongly disagreed − 13%, no answer − 13%).

As it can be seen, the students' perception about open communication was mostly neutral with a small shift to rating scale "agree", thus demonstrating a tendency to recognize the role of open communication in e-learning.

**3. Criteria: Group cohesion**

(SP_GH_AGR) I felt comfortable disagreeing with other course participants while still maintaining a sense of trust (strongly agreed − 13%, agreed − 17%, neither

agreed nor disagreed – 32%, disagreed – 11%, strongly disagreed – 13%, no answer – 14%).

(SP_GH_POINT) I felt that my point of view was acknowledged by other course participants (strongly agreed – 9%, agreed – 21%, neither agreed nor disagreed – 36%, disagreed – 11%, strongly disagreed – 10%, no answer – 13%).

(SP_GH_COLL) Online discussions helped me to develop a sense of collaboration (strongly agreed – 7%, agreed – 17%, neither agreed nor disagreed – 34%, disagreed – 13%, strongly disagreed – 15%, no answer – 14%).

**Table 3-8** The Students' Perception on Social Presence

| Criteria | Affective expression | | | Open communication | | | Group cohesion | | |
|---|---|---|---|---|---|---|---|---|---|
| Attitudes scale / Code / Answer of Respondents (%) | SP_AE_KNOW | SP_AE_IMPR | SP_AE_COM | SP_OC_COM | SP_OC_DISC | SP_OC_ACT | SP_GH_AGR | SP_GH_POINT | SP_GH_COLL |
| 5-strongly agree | 8 | 5 | 10 | 10 | 9 | 10 | 13 | 9 | 7 |
| 4-agree | 15 | 16 | 14 | 19 | 20 | 22 | 17 | 21 | 17 |
| 3-neither disagree nor agree | 26 | 22 | 25 | 30 | 33 | 30 | 32 | 36 | 34 |
| 2-disagree | 11 | 18 | 18 | 15 | 12 | 12 | 11 | 11 | 13 |
| 1-strongly disagree | 28 | 27 | 20 | 13 | 13 | 13 | 13 | 10 | 15 |
| No answer | 12 | 12 | 13 | 13 | 13 | 13 | 14 | 13 | 14 |

* Interpretation of codes used

| | |
|---|---|
| SP_AE_KNOW | Getting to know other course participants gave me a sense of belonging to the course. |
| SP_AE_IMPR | I was able to form distinct impression of some course participants. |
| SP_AE_COM | Online or web-based communication is an excellent medium for social interaction. |
| SP_OC_COM | I felt comfortable communicating through the online medium. |
| SP_OC_DISC | I felt comfortable participating in the course discussions. |
| SP_OC_ACT | I felt comfortable interacting with other course participants. |
| SP_GH_AGR | I felt comfortable disagreeing with other course participants while still maintaining a sense of trust. |
| SP_GH_POINT | I felt that my point of view was acknowledged by other course participants. |
| SP_GH_COLL | Online discussions helped me to develop a sense of collaboration. |

Concerning group cohesion, majority of respondents demonstrated quite neutral position in items dealing with perception of group-members in online learning.
The respondents' answers were:

> *I have not been very keen to contact all group-mates and lecturers in e-studies. On average, there has been learning material retrieval, and sometimes sending e-mail to lecturer, but it certainly did not apply to informatics.*
>
> *I contacted the lecturer via the Internet, and this communication had a positive impact on me.*

### 3.4.3 Cognitive Presence

Cognitive Presence (Table 3-9) will be analysed within four criteria which reveal questions linked to the cognitive aspects of the students' e-learning.

**1. Criteria: Triggering event**

(CP_TE_INT) Problems posed increased my interest in course issues (strongly agreed − 11%, agreed − 22%, neither agreed nor disagreed − 37%, disagreed −6%, strongly disagreed − 9%, no answer − 15%).

(CP_TE_CUR) Course activities provoked my curiosity (strongly agreed − 8%, agreed − 31%, neither agreed nor disagreed − 27%, disagreed − 10%, strongly disagreed − 9%, no answer − 15%).

(CP_TE_MOT) I felt motivated to explore content related questions (strongly agreed − 13%, agreed − 33%, neither agreed nor disagreed − 25%, disagreed − 8%, strongly disagreed − 5%, no answer − 16%).

The answers on the first criteria indicator *Triggering Event* show the students' interest in course topics, their curiosity and motivation to explore; it was clarified that majority of the respondents willingly engaged in such kind of activities. The evidence of this is the rating of scale "agree" and "neither disagree nor agree".

**2. Criteria: Exploration**

(CP_EXP_RES) I utilized a variety of information sources to explore problems posed in this course (strongly agreed − 23%, agreed − 27%, neither agreed nor disagreed

− 21%, disagreed − 9%, strongly disagreed − 4%, no answer − 16%).

(CP_EXP_BRST) Brainstorming and finding relevant information helped me resolve content related questions (strongly agreed − 8%, agreed − 16%, neither agreed nor disagreed − 39%, disagreed − 11%, strongly disagreed − 11%, no answer − 15%).

(CP_EXP_DISC) Online discussions were valuable in helping me appreciate different perspectives (strongly agreed − 6%, agreed − 20%, neither agreed nor disagreed − 34%, disagreed − 10%, strongly disagreed − 15%, no answer − 15%).

As concerns the criteria *Exploration* then the students considered that the main emphasis was using a variety of information sources for exploring problems. The evidence is similar choice of the answers with highest rating scale "strongly agree", "agree", and "neither agree nor disagree". From other indicators as online discussion and brainstorming − they were in balance.

**3. Criteria: Integration**

(CP_INTG_INF) Combining new information helped me answer questions raised in course activities (strongly agreed − 11%, agreed − 20%, neither agreed nor disagreed − 37%, disagreed − 7%, strongly disagreed − 10%, no answer − 15%).

(CP_INTG_LERN) Learning activities helped me construct explanations/solutions (strongly agreed − 10%, agreed − 31%, neither agreed nor disagreed − 31%, disagreed − 3%, strongly disagreed − 10%, no answer − 15%).

(CP_INTG_REFL) Reflection on course content and discussions helped me understand fundamental concepts in this class (strongly agreed − 7%, agreed − 23%, neither agreed nor disagreed − 33%, disagreed − 9%, strongly disagreed − 13%, no answer − 15%).

The analysis of the third criteria *Integration* shows that all the mentioned indicators − combining new information, different learning activities, and reflection and discussions equally helped the students' in e-learning.

**4. Criteria: Resolution**

(CP_RES_WAY) I can describe the ways to test and apply the knowledge created

in this course (strongly agreed – 9%, agreed – 24%, neither agreed nor disagreed – 34%, disagreed – 9%, strongly disagreed – 9%, no answer – 15%).

**Table 3-9** The Students' Perception on Cognitive Presence

| Criteria | Triggering event | | | Exploration | | | Integration | | | Resolution | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Attitudes scale / Code / Answer of Respondents (%) | CP_TE_INT | CP_TE_CUR | CP_TE_MOT | CP_EXP_RES | CP_EXP_BRST | CP_EXP_DISC | CP_INTG_INF | CP_INTG_LERN | CP_INTG_REFL | CP_RES_WAY | CP_RES_PRACT | CP_RES_WORK |
| 5-strongly agree | 11 | 8 | 13 | 23 | 8 | 6 | 11 | 10 | 7 | 9 | 5 | 21 |
| 4-agree | 22 | 31 | 33 | 27 | 16 | 20 | 20 | 31 | 23 | 24 | 19 | 25 |
| 3-neither disagree nor agree | 37 | 27 | 25 | 21 | 39 | 34 | 37 | 31 | 33 | 34 | 41 | 25 |
| 2-disagree | 6 | 10 | 8 | 9 | 11 | 10 | 7 | 3 | 9 | 9 | 9 | 6 |
| 1-strongly disagree | 9 | 9 | 5 | 4 | 11 | 15 | 10 | 10 | 13 | 9 | 11 | 8 |
| No answer | 15 | 15 | 16 | 16 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |

*Interpretation of codes used

CP_TE_INT Problems posed increased my interest in course issues.
CP_TE_CUR Course activities provoked my curiosity.
CP_TE_MOT I felt motivated to explore content related questions.
CP_EXP_RES I utilized a variety of information sources to explore problems posed in this course.
CP_EXP_BRST Brainstorming and finding relevant information helped me resolve content related questions.
CP_EXP_DISC Online discussions were valuable in helping me appreciate different perspectives.
CP_INTG_INF Combining new information helped me answer questions raised in course activities.
CP_INTG_LERN Learning activities helped me construct explanations/solutions.
CP_INTG_REFL Reflection on course content and discussions helped me understand fundamental concepts in this class.
CP_RES_WAY I can describe the ways to test and apply the knowledge created in this course.
CP_RES_PRACT I have developed solutions to course problems that can be applied in practice.
CP_RES_WORK I can apply the knowledge created in this course to my work or other non-class related activities.

(CP_RES_PRACT) I have developed solutions to course problems that can be applied in practice (strongly agreed – 5%, agreed – 19%, neither agreed nor disagreed – 41%, disagreed – 9%, strongly disagreed – 11%, no answer – 15%).

(CP_RES_WORK) I can apply the knowledge created in this course to my work or other non-class related activities (strongly agreed – 21%, agreed – 25%, neither agreed nor disagreed – 25%, disagreed – 6%, strongly disagreed – 8%, no answer – 15%).

The fourth criteria *Resolution* analyses the practical performance of the e-course – how the students can use created knowledge, how they can apply developed solutions in practice. The students' answers show that the most valuable benefits of e-course have been recognizing the acquired knowledge and the pragmatic use of this knowledge and skills for solving problems of theoretical issues and in real life. These responses have been assessed by the high ranking ("agree"), especially, the students' responses of applying the knowledge and skills in non-class related activities were evaluated by the highest ranking ("strongly agree").

# 4 Conclusions and Implications for Further Study

## 4.1 Conclusions of the Present Research

Based on the theoretical findings and the obtained data, the following conclusions can be drawn:

1. Based on the findings of the systemic-constructivist learning, connectivism or network learning, learning as social practice, and Garrison et al. teaching and learning

transaction model, a set of indicators has been developed and can be used to analyse the process of e-learning from the position of a student, an educator, and the e-environment. This set of indicators characterises necessary preconditions for the development of the students' e-learning motivation, e-learning experience, knowledge and skills in using ICT, attitude to using e-learning, the choice of e-study forms and methods, and building e-community based on *Teaching Presence, Social Presence, and Cognitive Presence.*

2. *Social Presence* is a critical factor in building the community of learners facilitating the achievement of cognitive aspects of learning. There are three categories of Social Presence: *affective expression, open communication, and group cohesion*. The data of the present research show that students underestimate the affective expression which supports a sense of belonging to the course and is important for social interaction. Open communication and group cohesion as key elements for students' interaction in e-environment have been more supported, thus demonstrating a tendency to recognise the role of open communication in e-learning. However, as the research data show, the virtual communication cannot replace real communication and conversations.

3. *Teaching Presence* is characterised as design and organization, facilitating discourse, and direct instruction. The data obtained in the present research displays that the priority has been given to the design and organisation of e-courses, it means, that lecturers are clearly communicating important course topics and significant course goals, as well as providing clear instructions on how to participate in course learning activities and course schedule. Facilitating discourse and direct instruction is sensitive issue as it is very significant for keeping students' interest, motivation, and engagement; the focus in e-studies should be shifting from teaching to learning.

4. *Cognitive Presence* is defined through the practical inquiry model, which consists of four phases: *triggering event, exploration, integration, and resolution*. As the present research reveals, there have been a similar distribution of students' answers concerning the mentioned phases. It means that the issue of the involvement of

the students in the process of investigation is relevant, and each phase should provide a successive impact on how interested and motivated the students are to engage in the course, how it catalyses the students' exploration through using a variety of sources and discussions for acquiring the topics of course, integration through ability to combine new information with existing knowledge in order to understand the concepts being taught, and resolution through the ability to apply the gained knowledge.

5. The main emphasis of the community of inquiry is to create an effective learning community that promotes effectiveness of the students' studies in e-environment. The present research has explored how good the patterns of social presence in e-learning as a mediating factor to facilitate learning in national context are. This study has discovered the students' understanding of e-learning:

    a) e-learning is a perspective, but it is not the only form of learning and it would be best to combine e-learning as distance learning form with face to face learning, it means, the priority is given blended learning;

    b) e-learning has a great potential for offer different kinds of study materials. As it is shown in the research there are mainly lecture materials (text format, images and other static information), sometimes videos, demos, and interactive learning materials, including automated training, also tests, questionnaires and exercises and tasks, but practically no lecture videos and live lectures online, which would be very useful in learning and repeating, have been used;

    c) e-learning is an opportunity for the students from the aspect of the personal time management and flexibility, of combining work with studies;

    d) e-learning is a challenge and a capability for the growth and development of the student as individual and social identity; for the development of competence of self-learning and self-organisation;

e) e-learning is a possibility to provide multiple forms of communication between the lecturer and student, student and student; it is most uncertain and sensitive issue revealed in this research. It means that socialisation in e-learning environment is one of the main factors which influences the effectiveness of the students' e-learning and will require a deeper and more fundamental investigation.

## 4.2 Implications for Future Study

Primary quantitative and qualitative data were obtained by the means of a questionnaire using closed-ended questions (Likert's scales consisting of one to five answer options) and open-ended questions. To analyse the data, there were used only primary mathematical statistical data processing methods (descriptive statistics depicted by tables and graphs). Thus, the interpretation of the study data is limited by the use of descriptive statistics, and it would be relevant to use secondary mathematical statistical data processing methods to reveal the hidden interconnections among *Teaching Presence, Social Presence and Cognitive Presence* and the comparison of the students from different target groups to find differences and common characteristics.

Since the number of respondents was small, qualitative data processing had not been performed. Future research study with larger sample size could be undertaken to make the qualitative data processing by the means of the programme AQUAD 7.0 and develop coding system based on the theories used in this research.

However, due to the small sample size, the present research has only highlighted the trends in students' perception of e-learning, it is still possible to generalise these findings and use in further studies. The research has to be continued as a comparative international research with the goal to provide the proposals based on the evidence practice on how to increase the ratio of inhabitants (aged 18－24) with basic and

secondary education and ready to learn (EU 2020: ESL <10%) and what measures should be taken in order to attract adults (aged 18－24) to acquire basic and secondary education. It will be carried out in the framework of ESF project study "Identification and Analysis of New Challenges and Solutions that Have Influence on Engagement and Reintegration of Adults (18－24 years) in Learning" (Latvia).

As one of the benefits of this study could be the quotation given by one of the respondents:

> *Thank you for the opportunity to reflect on the effectiveness of the e-course!*
>
> *I would like to see the implementation of all the possibilities mentioned in the survey in e-learning environment.*

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## List of the Tables



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# Appendix 1

## The Questionnaire

*We invite you to participate in the study! In the framework of Asian and European Education and Research Hub for Lifelong Learning (ASEM LLL Hub, http://www.dpu.dk/asem/aboutasem/) Network No1. "Development of ICT Skills, E-learning and the Culture of E-learning in Lifelong Learning" (http://ease-m.knou.ac.kr/), Latvia is carrying out the study on e-learning focusing on the aspect of the social presence.*

*The survey has been designed for e-learning students in the higher education institutions and evening schools. It consists of two parts: general questions (Part 1) and the questions on the social presence (Parts 2~4) based on research tools designed by Garrison, Anderson, and Archer, 2000.*

*Respondents have been offered different kinds of questions: (1) multiple choice questions, (2) ranking questions in five-point scale, (3) Likert-type scale questions and (4) open-ended question.*

*Participation in the survey is anonymous. If you are interested in the issues raised in the survey and you want to receive an answer to any question, please, fill in the comments and information about yourself (e-mail, telephone, etc.) at the end of the questionnaire. Completing the survey will take about half an hour of your time. Thank you for your participation in the survey!*

**1.1. I am a (Choose one of the answers)**

Female

Male

**1.2. I am ... years old (enter years with numbers)**

**1.3. (Question for students) I am studying at ... university/school (please, select one answer from the list)**

**1.4. (Question for lecturers) I work at ... university/school (please, select one answer from the list)**

**1.5. I am studying in / have graduated from / ... study programme (please, choose one**

**answer from the list)**

**1.6. My study program is ... (please, put it down)**

**1.7. I am the student of ... year (please, choose from the list)**

**1.8. I associate e-learning with (1 – strongly disagree, 2 – disagree, 3 – neither disagree nor agree, 4 – agree, 5 – strongly agree)**

Distance learning

Blended learning which takes place in both the e-environment and face to face with lecturer

The use of computer in my learning

A group online learning at the same time (synchronous)

A group online learning at different times (asynchronous)

Individual online learning at my own pace

Individual learning at my own pace, not online

**1.9. My e-learning experience is (please, choose one of the offered answers)**

Less than one year

One year

Two years

Three years and more

No experience at all

OTHER (please specify)

**1.10. My computer skills are (please, use 5-point scale, where 1 – very poor, 2 – poor, 3 – satisfactory, 4 – good, 5 – excellent)**

OTHER (please specify)

**1.11. My computer skills have got impact on my e-learning (please, use 5-point scale, where 1 – strong impact, 2 – some impact, 3 – neutral impact, 4 – almost no impact, 5 – no impact at all)**

**1.12. In e-learning courses I use (1 – never, 2 – rarely, 3 – sometimes, 4 – often, 5 – very often)**

Lecture materials (text format, images and other static information)

Lecture materials supplemented by dynamic information (videos, demos, etc.)

Interactive learning materials including self-assessed learning

The videos of lectures

Live lectures online

Exercises and tasks for knowledge acquisition

Check-up works

Tests

Free discussions

Course forums on specific topics

Chats

Polls

Communication with lecturers

Communication with other students

OTHER (please specify)

**1.13. I choose/ I would choose e-learning because (1 – strongly disagree, 2 – disagree, 3 – neither disagree nor agree, 4 – agree, 5 – strongly agree)**

I can learn individually at my own time

I can work and study

I can live and work in another country, but study in Latvia

I can plan my own study time

I can communicate online, so lesson attendance is not compulsory

I can discuss things with my course mates

I can choose learning resources and learn according to my needs and abilities

I can learn new knowledge, develop skills and competence working in previously unknown situations

OTHER (please specify)

**1.14. In e-learning I miss (1 – never, 2 – rarely, 3 – sometimes, 4 – often, 5 – very often)**

Online communication, so there is the feeling of loneliness

Time planning skills (I am losing time looking for problem solutions alone)

Possibility to carry out the activities I am interested in

Clear procedure and regulations of course organization

Cooperation with other students

Interaction in virtual communication and online forums

Lecturer's consultations

Group work

ICT knowledge and skills

OTHER (please specify)

**1.15. I have got access to computer (please, evaluate in 5-point scale, where 1 – completely no, 2 – almost no, 3 – both: no and yes, 4 – almost yes, 5 – completely yes)**

**1.16. My Internet connection is ... (please, evaluate in 5-point scale, where 1 – very slow, 2 – nearly slow, 3 – medium fast, 4 – nearly fast, 5 – very fast)**

**1.17. I like e-learning because (1 – strongly disagree, 2 – disagree, 3 – neither agree nor disagree, 4 – agree, 5 – strongly agree) I can:**

Get new learning experience

Get in contact and discuss things with course mates

Get in touch and consultations with lecturers

Get different course members' views and change my opinion

Develop my learning competencies

Improve my ICT knowledge and skills

OTHER (please specify)

**1.18. My previous positive learning experience (at school, university, courses, etc.) influenced my e-learning (please, give an example)**

**1.19. Any of my previous negative learning experience (at school, university, courses, etc.) influenced my e-learning (please, give an example)**

**1.20. I have helped my course mates in e-learning (please, give an example)**

**1.21. I have received help from my course mates or lecturer in e-learning (please, give an example)**

**1.22. I think that e-learning compared to other organisational forms of teaching/learning has advantages: (please specify)**

**1.23. I think that e-learning compared to other organisational forms of forms of teaching/learning, has disadvantages: (please specify)**

**2. Please, evaluate the below mentioned statements concerning your e-learning experience in 5-point scale (1 – strongly disagree, 2 – disagree, 3 –neither agree nor disagree, 4 – agree, 5 – strongly agree):**

2.1. The lecturer clearly communicated important course topics.
2.2. The lecturer clearly communicated important course goals.
2.3. The lecturer provided clear instructions on how to participate in course learning activities.
2.4. The lecturer clearly communicated important deadlines for learning activities.
2.5. The lecturer was helpful in identifying the areas of agreement and disagreement on course topics that helped me to learn.
2.6. The lecturer was helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking.
2.7. The lecturer helped to keep course participants engaged and participate in productive dialogue.
2.8. The lecturer helped to keep the course participants on task in a way that helped me to learn.
2.9. The lecturer encouraged course participants to explore new concepts in this course.
2.10. Lecturer's actions reinforced the development of a sense of community among course participants.
2.11. The lecturer helped to focus discussion on relevant issues in a way that helped me to learn.
2.12. The lecturer provided feedback that helped me to understand my strengths and weaknesses.
2.13. The lecturer provided feedback in a good time.
OTHER (please specify)

**3. Please, evaluate the below mentioned statements concerning your e-learning experience in 5-point scale (1 – strongly disagree, 2 – disagree, 3 – neither agree nor disagree, 4 – agree, 5 – strongly agree):**

3.1. Getting to know other course participants gave me a sense of belonging to the course.
3.2. I was able to form distinct impression of some course participants.
3.3. Online or web-based communication is an excellent medium for social

interaction.

3.4. I felt comfortable communicating through the online medium.

3.5. I felt comfortable participating in the course discussions.

3.6. I felt comfortable interacting with other course participants.

3.7. I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.

3.8. I felt that my point of view was acknowledged by other course participants.

3.9. Online discussions helped me to develop a sense of collaboration.

OTHER (please specify)

**4. Please, evaluate the below mentioned statements concerning your e-learning experience in the 5-point scale (1 – strongly disagree, 2 – disagree, 3 – neither agree nor disagree, 4 – agree, 5 – strongly agree):**

4.1. Problems posed increased my interest in course issues.

4.2. Course activities provoked my curiosity.

4.3. I felt motivated to explore content related questions.

4.4. I utilized a variety of information sources to explore problems posed in this course.

4.5. Brainstorming and finding relevant information helped me to resolve content related questions.

4.6. Online discussions were valuable in helping me to appreciate different perspectives.

4.7. Combining new information helped me to answer questions raised in course activities.

4.8. Learning activities helped me to construct explanations/solutions.

4.9. Reflection on course content and discussions helped me to understand fundamental concepts in this class.

4.10. I can describe the ways to test and apply the knowledge created in this course.

4.11. I have developed solutions to course problems that can be applied in practice.

4.12. I can apply the knowledge created in this course to my work or other

non-class related activities.

OTHER (please specify)

**Anything else I would like to add: (please specify)**

Thank you for your cooperation! If you want an electronic copy of the survey data, please put down your e-mail address:

## Appendix 2

### The Codes Used in the General Part of the Questionnaire

| | |
|---|---|
| G_SEX | 1.1. I am a |
| G_SEX_F | Female |
| G_SEX_M | Male |
| G_AGE | 1.2. I am ... years old |
| G_L_INST | 1.3. I am studying at ... university/school |
| G_W_INST | 1.4. I work at ... university/school |
| G_F_INST | 1.5. I am studying in /have graduated from ... study programme |
| G_L_PROG | 1.6. My study program is ... |
| G_L_COUR | 1.7. I am the student of ... year |
| | 1.8. I associate e-learning with |
| E_LERN_A_DIST | Distance learning |
| E_LERN_A_BLEND | Blended learning which takes place in both the e-environment and face to face contact with lecturer |
| E_LERN_A_COMP | The use of computer in my learning |
| E_LERN_A_GROUP_S | A group online learning at the same time (synchronous) |
| E_LERN_A_GROUP_A | A group online learning at different times (asynchronous) |
| E_LERN_A_INDV_ON | Individual online learning at my own pace |
| E_LERN_A_INDV_ON_W | Individual learning at my own pace, not online |
| E_LERN_A_OTH | OTHER |

| | |
|---|---|
| | 1.9. My e-learning experience is |
| G_EXP_ | Less than one year |
| G_EXP_1 | One year |
| G_EXP_2 | Two years |
| G_EXP_3 | Three years and more |
| G_EXP_0 | No experience at all |
| G_EXP_OTH | OTHER |
| G_ICTSK<br>G_ICTSK_1<br>G_ICTSK_2<br>G_ICTSK_3<br>G_ICTSK_4<br>G_ICTSK_5<br>G_ICTSK_OTH | 1.10. My computer skills are |
| E_ICTSKEf<br>E_ICTSKEf_1<br>E_ICTSKEf_2<br>E_ICTSKEf_3<br>E_ICTSKEf_4<br>E_ICTSKEf_5<br>E_ITSK_OTH | 1.11. My computer skills have got impact on my e-learning |
| | 1.12. In e-learning courses I use |
| E_R_LECT | Lecture materials (text format, images and other static information) |
| E_R_DYNAMIC | Lecture materials supplemented by dynamic information (videos, demos, etc.). |
| E_R_CAL | Interactive learning materials including self-assessed learning |
| E_R_VIDEO | The videos of lectures |
| E_R_VIDEO_LIV | Live lectures online |
| E_R_TASK | Exercises and tasks for knowledge acquisition |
| E_R_CHECK | Check-up works |
| E_R_TEST | Tests |

| | |
|---|---|
| E_R_DISC | Free discussions |
| E_R_FOR | Course forums on specific topics |
| E_R_CHAT | Chats |
| E_R_QUEST | Polls |
| E_R_COM_T | Communication with lecturers |
| E_R_COM_ST | Communication with other students |
| E_R_OTH | OTHER |
| | 1.13. I choose/ I would choose e-learning because |
| E_OPT_FT | I can learn individually at my own time |
| E_OPT_WL | I can work and study |
| E_OPT_AB | I can live and work in another country, but to study in Latvia |
| E_OPT_PL | I can plan my own study time |
| E_OPT_NoL | I can communicate online, so lesson attendance is not compulsory |
| E_OPT_DISC | I can discuss things with my course mates |
| E_OPT_RES | I can choose learning resources and learn according to my needs and abilities |
| E_OPT_CHAL | I can learn new knowledge, develop skills and competence working in previously unknown situations |
| E_OPT_OTH | OTHER |
| | 1.14. In e-learning I miss |
| E_MIN_COM | Online communications, so there is the feeling of loneliness |
| E_MIN_TIME | Time planning skills (I am losing time looking for problem solutions alone) |
| E_LIKE_COMP | Possibility to carry out the I am interested in |
| E_LIKE_ORG | Clear procedure and regulations of course organization |
| E_MIN_COOP | Cooperation with other students |
| E_MIN_INTERACT | Interaction in virtual communication and online forums |

| | |
|---|---|
| E_MIN_HELP | Lecturer's consultations |
| E_MIN_GROUP_ACT | Group work |
| E_MIN_ICTSK | ICT knowledge and skills |
| E_MIN_OTH | OTHER |
| | 1.15. I have got access to computer |
| G_COMP_1 | 1 – completely no |
| G_COMP_2 | 2 – almost no |
| G_COMP_3 | 3 – both: no and yes |
| G_COMP_4 | 4 – almost yes |
| G_COMP_5 | 5 – completely yes |
| G_COMP_OTH | |
| | 1.16. My Internet connection is ... |
| G_INTERN_1 | 1 – very slow |
| G_INTERN_2 | 2 – nearly slow |
| G_INTERN_3 | 3 – medium fast |
| G_INTERN_4 | 4 – nearly fast |
| G_INTERN_5 | 5 – very fast |
| G_INTERN_OTH | |
| | 1.17. I like e-learning because I can: |
| E_LIKE_EXP | Get new learning experience |
| E_LIKE_CCOM | Get in contact and discuss things with course mates |
| E_LIKE_LCOM | Get in touch and consultations with lecturers |
| E_LIKE_VPCOM | Get different course members' views and change my opinion |
| E_LIKE_COMPETENCE | Developed my learning competencies |
| E_LIKE_ICT | Improve my ICT knowledge and skills |
| E_LIKE_OTH | OTHER |
| P_PREV_EXP_POS | 1.18. My previous positive learning experience (school, university, courses, etc.) influenced my e-learning (please, give an example) |
| P_PREV_EXP_NEG | 1.19. Any of my previous negative learning experience (school, university, courses, etc.) influenced my e-learning (please, give an example) |

| | |
|---|---|
| P_HELP_GMATES | 1.20. I have helped my course mates (please, give an example) |
| P_HELP_GMATES_TEACH | 1.21. I have received help from my course mates or lecturer in e-learning (please, give an example) |
| P_ADVANTAGE | 1.22. I think that e-learning compared to other organisational forms of teaching/learning has advantages: (please, give an example) |
| P_DISADVANTAGE | 1.23. I think that e-learning compared to other organisational forms of teaching/learning has disadvantages: (please, give an example) |

# Appendix 3

## The Codes Used in the Specific Part of the Questionnaire

**Codes of Teaching Presence***

| Code/ Criteria | Indicators |
|---|---|
| Design & Organization | |
| TP_DO_TOP | 1. The lecturer clearly communicated important course topics. |
| TP_DO_GOAL | 2. The lecturer clearly communicated important course goals. |
| TP_DO_ACT | 3. The lecturer provided clear instructions on how to participate in course learning activities. |
| TP_DO_TIME | 4. The lecturer clearly communicated important dealines for learning activities. |
| Facilitation | |
| TP_FACIL_AGR | 5. The lecturer was helpful in identifying areas of agreement and disagreement on course topics that helped me to learn. |
| TP_FACIL_QUID | 6. The lecturer was helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking. |

| | |
|---|---|
| TP_FACIL_ENG | 7. The lecturer helped to keep course participants engaged and participate in productive dialogue. |
| TP_FACIL_LERN | 8. The lecturer helped to keep the course participants on task in a way that helped me to learn. |
| TP_FACIL_CONC | 9. The lecturer encouraged course participants to explore new concepts in this course. |
| SP_FACIL_COM | 10. Lecturer's actions reinforced the development of a sense of community among course participants. |
| Direct Instruction | |
| SP_DI_FOCUS | 11. The lecturer helped to focus discussion on relevant issues in a way that helped me to learn. |
| SP_DI_FEED | 12. The lecturer provided feedback that helped me to understand my strengths and weaknesses. |
| SP_DI_HELP | 13. The lecturer provided feedback in a good time. |

* Community of Inquiry Survey Instrument

**Codes of Social Presence***

| Code/ Categories | Indicators |
|---|---|
| Affective expression | |
| SP_AE_KNOW | 14. Getting to know other course participants gave me a sense of belonging to the course. |
| SP_AE_IMPR | 15. I was able to form distinct impression of some course participants. |
| SP_AE_COM | 16. Online or web-based communication is an excellent medium for social interaction. |
| Open communication | |
| SP_OC_COM | 17. I felt comfortable communicating through the online medium. |
| SP_OC_DISC | 18. I felt comfortable participating in the course discussions. |
| SP_OC_ACT | 19. I felt comfortable interacting with other course participants. |
| Group cohesion | |

| | |
|---|---|
| SP_GH_AGR | 20. I felt comfortable disagreeing with other course participants while still maintaining a sense of trust. |
| SP_GH_POINT | 21. I felt that my point of view was acknowledged by other course participants. |
| SP_GH_COLL | 22. Online discussions helped me to develop a sense of collaboration. |

* Community of Inquiry Survey Instrument

**Codes of Cognitive Presence***

| Code/ Categories | Indicators |
|---|---|
| Triggering event | |
| CP_TE_INT | 23. Problems posed increased my interest in course issues. |
| CP_TE_CUR | 24. Course activities provoked my curiosity. |
| CP_TE_MOT | 25. I felt motivated to explore content related questions. |
| Exploration | |
| CP_EXP_RES | 26. I utilized a variety of information sources to explore problems posed in this course. |
| CP_EXP_BRST | 27. Brainstorming and finding relevant information helped me resolve content related questions. |
| CP_EXP_DISC | 28. Online discussions were valuable in helping me appreciate different perspectives. |
| Integration | |
| CP_INTG_INF | 29. Combining new information helped me answer questions raised in course activities. |
| CP_INTG_LERN | 30. Learning activities helped me construct explanations/solutions. |
| CP_INTG_REFL | 31. Reflection on course content and discussions helped me understand fundamental concepts in this class. |
| Resolution | |
| CP_RES_WAY | 32. I can describe the ways to test and apply the knowledge created in this course. |

| | |
|---|---|
| CP_RES_PRACT | 33. I have developed solutions to course problems that can be applied in practice. |
| CP_RES_WORK | 34. I can apply the knowledge created in this course to my work or other non-class related activities. |

* Community of Inquiry Survey Instrument

# An Effect of interactive media in a Social Awareness Ubiquitous learning community

05

**Author**

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## Jaitip Nasongkhla

Associate Professor Dr. Jaitip Nasongkhla, Deputy Dean for ICT, Faculty of Education, Chulalongkorn University and Director of Innovative Educational Technology Research Center. Her expertise is in the area of digital and mobile Learning Technology as well as technology in organization that includes approaches in Performance Technology and Knowledge Management. Her academic contribution in Career/Professional Development is continually to school teachers and faculty development. Her published books and articles are in a spectrum of E-learning, Web Collaborative Learning, Performance & Technology, Social Media, Distance/Flexible Learning, and Virtual Learning Environment, as well as Teacher and Faculty Development policy. Currently her initial efforts and ongoing projects in Thailand are a holistic learning approach of "Life Long Learning" and "Educational for All" through New Media; the attempt is to bring about a convergence of Corporate Social Responsibility (CSR) and a muti-nation ASEAN' s cultural identity building.

Chulalongkorn University collaboratively worked with the Office of Basic Education, and Department of Highways, with a support from a Corporate Social Responsibility Unit (CSR) of Toyota motor Thailand on building up a road safety awareness in a White Road Community Project. The project aimed at cultivating a social awareness, "from a school to a community", empowered by a set of interactive media that supports a ubiquitous learning environment.

A framework of "a Ubiquitous Learning Community: from a School to a Community", was initially derived from an expert focus group technique, consisted of three phrases of work: (1) A development of interactive media for a social awareness, (2) An accelerate teacher training network, and (3) An establishment of a ubiquitous learning community. An interactive media so-called a "White-Road Social Awareness Toolkit", is a design of media for learning intervention based upon a contunium of an abstract to a concrete learning experiences, consisted of a simple interactive paper-printed book integrated with an Augmented Reality (AR), an interactive game-based learning, a Virtual Learning Center, and a Multimedia Blog for an Appreciative Inquiry (AI) discussion, as well as a Digital Storytelling of learning community members.

The second phrase of the project when the toolkits were fully developed, teacher training programs are offered to volunteer teacher members. To lead an active learning in school and to bind teachers to be a network group, participants were introduced to a"WhiteRoad safety Wikipedia" in a chapter of an Integrated Road-Safety Lesson Plan, and invited to write and share their lesson plans based on a "Challenged-based Learning technique", in which students together with community set an achieving goal of community road safety issues. In the final phrase of establishing a ubiquitous learning community, teachers lead students to perform a road safety learning task in their community, and using their mobile devices took pictures, recorded sound or video clips of their works, and create a digital storytelling VDO clips to be uploaded to the social network community learning platform.

A mix method research design was applied throughout this project. The framework of "a Ubiquitous Learning Community: from a School to a Community" was implemented to a group of 68 teachers and 124 students from 20 schools and people

in communities in the central part of Thailand. The result showed the high level of road-safety social awareness of the sampling group. There were evidences of the establishment of seven active learning communities. The interactive media were found to be instructional realistic, purposefully emotional involvement, and meanwhile bridging learning tasks to a social awareness in a ubiquitous learning environment.

## Introduction

In a decade in which wireless technology flourished in Thailand, new generation spends hours of learning and playing on their mobile devices. A neo-millennium learning style is defined to describe a young generation who interweaves his/her learning and playing in a blended mode of communication (face-to-face VS online) across distance and time differences. This learning and life style has dramatically changed the way of people communicate and learn. Adult or even elderly group needs to adapt this new communication skill to keep up with the changing world. This new dimension of communication and learning hence opens up an opportunity for learning to take place without a scope of time, limitation of age & genders, or a boundary of classroom. An online community becomes a virtual place where formal and non-formal learning is converged. Learning community, a physical or a virtual one, is a group of people who share common emotions, values and beliefs, and are actively engaged in learning together, and from each other. Members of a learning community feel a sense of belonging that drive their desires to continuously work and help each other learn throughout their circle of learning interests.

An increase use of handheld and portable devices, along with pervasive wireless network binds schools and communities together. People in this age carry the Internet in their pockets; teaching and learning is needed to be re-positioned to a learning that not limit in a boundary of classroom, but being authentic and lean more to a community context. Classroom and community together can learn and share appropriate social values and beliefs with the use of a ubiquitous technology. An online

learning community although can occur by an arrangement of a purposive communication; a particular pedagogical design enhanced by a set of interactive media can accelerate learning goal and a social value outcome.

With a support from a Corporate Social Responsibility (CSR) unit of Toyota motor Thailand, Chulalongkorn University collaboratively worked with the Office of Basic Education, Department of Highways on a Road Safety Project to establish a white road learning community. The project was aimed to cultivate a road safety social awareness, "from a school to a community", by using a set of interactive media to enhance a Ubiquitous Learning environment,that learning can occur in anytime, anywhere, and accelerate its outcome by computer, phone or mobile devices. The framework of "from a school to a community" is basically an attempt to cultivate a social value with a contextual learning through a school activity; students carry out their own community road safety issues that reflected their learning tasks in a real world.

## 1 Social awareness: A social Value and Attitudes change

Social awareness is one type of values. Value is a part of an individual's attitude, pre-deposition to respond to people, environments, or objects. Values can be defined as broad preferences concerning appropriate actions or outcomes. Personal values generate behaviors, providing an internal reference in favor of good, beneficial, or important, etc. Values represent what individuals think, are worthwhile and accepted it as a belief or idea of their own. When individuals experience a particular event, they decide either to put values into decision every time. Values are basic conduct of stays and practice of people in everyday life. For example, the values of Thai

people in general, differ from the values of Western, such as Thai considered peaceful emotional merit, respectful behaviors to parents and grateful those who are to be honored.

Features of values can be determined by the characteristics that:

- individual has an opportunity to choose from several options without forcing it, and feel it's fit an operational,
- individual feels honored and proud to accept, support and worship
- individual holds real action, not just a surface behavior, and importantly react to the situations based on the value as a permanent behavior.

Values can be obtained in many ways. The most important places for building values are from home and school. Family is responsible for teaching children what is right and wrong long before there are other influences. Social Practitioners found values are formed during three significant periods: (1) Imprint period from birth to 7 years of age, especially when it comes from parents. (2) Modeling period from 8 -14 years, learning by trying things how people feel suit and fit (3) Socialization period from 15-21 years naturally turn to people that seem more alike, and exchanging with a social and peer groups(Massey, 1998).

## 1.1 A social value

A social value can be altered by a process of learning -- three domains of learning: Cognitive -- mental skills (Knowledge); Psychomotor -- manual or physical skills (Skills); and Affective -- growth in feelings or emotional areas (Attitude) (Krathwohl, 1964). Affective responses are parts of attitudes, learned or established predispositions to respond (Zimbardo&Leippe, 1991).Attitudes are systems or constructs that are composed of four interrelated qualities: affective responses, cognitions, behavioral intentions, and behaviors. Attitudes are acquired, although arguments are that some

attitudes may be innate or may have biological origins. Attitudes are not directly observable, but the actions and behaviors to which they contribute may be observed. Although the cognitive and affective "domains interact significantly in instruction and learning", any behavior that has an emotional component lies within the affective domain.

Five stages of affective domains are Receiving, Responding, Valuing, Organization, and characterization. "Receiving" or "Awareness" is a stage individuals are being aware of or sensitive to the existence of certain ideas. "Responding" is a stage of committing in some small measure to the ideas, materials, or phenomena involved by actively responding to them. "Valuing" stage is willing to be perceived by others as valuing certain ideas, materials, or phenomena. Individuals "organize" by relating the value to those already held and bring it into a harmonious and internally consistent philosophy. The "Characterization", finally, come by value or value set is to act consistently in accordance with the values individuals have internalized.

## 1.2 Attitude change through an instruction process

Attitude change is an alteration in the direction, degree, or intensity of an attitude. A change in one component of a given attitude may produce change in other components. Moreover, attitudes about one object/event may be connected to attitudes about another object/event, and change in one attitude may lead to change in others (Zimbardo&Leippe, 1991).

Theorists (Smith & Ragan, 1999) considered an affect to be a post-cognitive process. An affect is thought to be elicited only after a certain amount of cognitive processing of information has been accomplished. In this view, an affective reaction is based on a prior cognitive process in which a variety of content discriminations are made and features are identified, examined for their value, and weighted for their contributions (Brewin,1989). Some scholars (Lerner and Keltner 2000) argue that an affect can be both pre- and post-cognitive, with thoughts being produced by initial

emotional responses, and further affect being produced by the thoughts. In a further iteration, some scholars argue that an affect is necessary to enable more rational modes of cognition.

Several educators proposed strategies to alter individuals' attitudes. Simonson and Maushak (2001) drew findings from numbers of studies, and created six major guidelines for effective design of attitude instruction. These are:

- make the instruction realistic, relevant, and technically stimulating,
- present new information,
- present persuasive messages in a credible manner,
- elicit purposeful emotional involvement,
- involve the learner in planning, production or delivery of the message,
- provide post-instruction discussion or critique opportunities.

Smith and Ragan (1999) focused on the behavioral aspect of attitude learning and emphasize the importance of three key instructional approaches:

- demonstration of the desired behavior by a respected role model
- practice of the desired behavior, often through role playing
- reinforcement of the desired behavior

Bednar&Levie (1993) proposed an instructional design for attitude change with three approaches emerged from theoretical literature: providing a persuasive message; modeling and reinforcing appropriate behavior; and inducing dissonance between the cognitive, affective, and behavioral components of the attitude. Researchers suggest that learners will experience more attitude change if the cognitive aspects of a lesson are presented before the affective aspects being introduced, while some others suggest the opposite effect. However, Zimbardo&Leippe's study (1991) proposed presenting first the general and then the particular, first the abstract and then the concrete would seem to be sound instructional design for both cognitive and affective domains.

# 2 Ubiquitous Learning Community

Ubiquitous learning has been recognized by the use of wireless technology via Wi-Fi, cellular phone services, or mobile satellite communication, to enhance learning opportunities to be taken place wherever the data communication services can be reached. A combination of landline connection and wireless system reinforce a holistic learning approach, learning community; where formal, non-formal and informal learning shared theirs spaces and experiences, that are primacy, interactivity, adaptability, and situational-based learning.

## 2.1 Learning community

Learning community is a group of people who share common emotions, values and beliefs that are actively engaged in learning together. Such communities have become the template for a cohort-based, interdisciplinary approach to higher education. This may be based on an advanced kind of educational or pedagogical design.Community psychologists such as McMillan and Chavis (1986) state that there are four key factors that defined a sense of community: "(1) membership, (2) influence, (3) fulfillment of individuals needs and (4) shared events and emotional connections. So, the participants of learning community must feel some sense of loyalty to the group that drives their desire to keep working and helping others. Also, the things that the participants do must affect what happened in the community. Besides, a learning community gives the chance to the participants to meet particular needs by expressing personal opinions, asking for help or specific information and share stories of events with an emotional connection. (Miller, 2008)

## 2.2 Ubiquitous Learning

The word "Ubiquitous", originally comes from "Ubiquitous computing", is a post-desktop model of human-computer interaction in which information processing has been thoroughly integrated into everyday objects and activities. In other words, Ubiquitous computing is defined as machines that fit the human environment instead of forcing humans to enter theirs. Mark Weiser, coined the term "Ubiquitous Computing", that stated a ground of computer that the purpose of computer, that is to help doing things; quiet & calm, invisible servant and extend human intuition and unconscious. Currently, three basic forms of ubiquitous devices are tablets/pads, smart-phone and boards. Tablets/Pads are a wearable centimeter sized devices; smart-phone are hand-held decimeter-sized devices; and boards are meter sized interactive display devices.

Ubiquitous learning, later is known as its equivalent to some form of simple mobile learning via a hand-held or Tablets platforms, that learning environments can be accessed in various contexts and situations. A ubiquitous learning environment is then included any setting in which learners become totally immerse in a learning process. A ubiquitous learning environment can be a situation or setting of pervasive or omnipresent education or learning. Learning can happen all around the learners, without being conscious of the learning process.

Chen and Kao (2002) concluded characteristics of U-Learning as following:

- Permanency: all the learning processes are everyday.
- Accessibility: Information is provided based on requests. Then, the learning involved is self-directed.
- Immediacy: Learners can solve problems just-in-time, for their abilities to retrieve information.
- Interactivity: Learners can interact with experts, teachers, or peers in the form of synchronous or asynchronous communication.
- Situating of instructional activities: The learning could be embedded in a contextual situation.

• Adaptability: Learners can get the right information by their judgments.

## 3 Interactive media

Interactive media, in technological term, is associated with primarily human–machine relations, pertaining to or being a computer or other electronic device that allows a two-way flow of information between technology and a user, responding immediately to the user's inputs. A new genre of interaction has developed through participation with increasingly subjective and semi-autonomous technological devices. In Social science interactive media, was referred also to an ability of computer devices and software especially in a network environment, that encourage an interaction between users at the end of the computer terminals.

Discussion on media attributes, found in researches, have substantial impacts on learners' affective domain of learning. Based on Information processing theory, the levels of processing framework; Clark, R. (2001) postulates separate stages for sensory, working, and long-term memory. Information is processed at multiple levels simultaneously, depending on its characteristics. The deeper the processing, the more information will be remembered. For example, information that references several contexts, such as a visual image and a story will be processed at a deeper level. In addition, individuals remember events that are more meaningful, because it requires more processing than meaningless events.

The Visual Instructional Movement, Edgar Dale's, explained by his classic model of "Cone of Experience", learning experiences cab be developed based on concrete/abstract continuums set of media. The peak of this movement arose the field of "Instructional media", along with the growth of psychological principles; this movement was later being known by "technology of instruction" or "educational technology", which is increasingly dependent on theory and empirical data. With

its interdisciplinary of Psychology, Computer, Communications and other sources of disciplines, Educational Technology contributes its works on cognitive, affective, and psychomotor domains of learning. Studies found emotion is fundamental to human experience, influencing cognition, perception, and everyday tasks such as learning, communication, and even rational decision-making. However, technologists have largely ignored emotion and created an often frustrating experience for people, in part because affect has been misunderstood and hard to measure.

An example of designing a qualitative persuasive message into a video medium for recipients' cognitive responses; Zimbardo&Leippe's study (1991) found that persuasive videos were more likely to produce attitude change when post-viewing discussions were held. If the instructional unit begins with an emphasis on cognitive outcomes, continues with the persuasive media message, and concludes with a discussion session, then students will be challenged with several opportunities to develop and express their own cognitive responses to the information presented. Thus, the persuasive component should not merely restate the information provided earlier, but elaborate and expand upon it.

Moreover, Researchers at University of Chicago have developed technologies and theories that advance basic understanding of affect and its role in human experience. They aimed to restore a proper balance between emotion and cognition in the design of technologies for addressing human needs. Affective Computing is referred in the studies to computing that relates to, arises from, or deliberately influences emotion or other affective phenomena.

The Affective Computing research combines engineering and computer science with psychology, cognitive science, neuroscience, sociology, education, psychophysiology, value-centered design, and ethics. The research developed and designed new ways for people to communicate affective-cognitive states. For examples, instant messaging clients are frequently and widely used for interpersonal communication, they lack the richness of face-to-face conversations. A Conductive Chat technology is an instant messenger client that integrates users' changing skin conductivity levels into their typewritten dialogue. Skin conductivity level is frequently used as a measure of emotional arousal, and high levels are correlated with cognitive states such as high stress,

excitement, and attentiveness. Other example of fostering meta-affective skill; the tool helps fostering affect awareness and regulation in learning. This research developed theory and technology to help learners develop meta-affective skills. Researches on technology and affective area, for instance; emotional health system, Girls Involved in Real-Life Sharing (G.I.R.L.S.), allowed users to reflect actively upon the emotions related to their situations through the construction of pictorial narratives. The system employed common-sense reasoning to infer affective content from the users' stories and support emotional reflection. Interactions with technologies allow for active user control.

Other perspectives of interactive media, Margaret (1998) identified interactivity as a mean of allowing the consumer/viewer to select or change the image with the help of an input device — telephone, keyboard, remote control, joystick, mouse, touch-screen, brain wave reader, etc. It is an ability of the user to participate in the creation or modification of a medium. Marshall McLuhan tracked the emergence of this new interaction through his explanation of 'hot' and 'cool' media. While cool media that encouraged the interaction of their users, "hot media did not leave so much to be filled in or completed by the audience. Hot media were, therefore, low in participation, and cool media are high in participation or completion by the audience." The cool was not necessary to be mechanistic, yet invited and increased a level of collaboration and interaction.

In addition to an automat interactive technological system, the idea based on learning by doing activities are in favor to collaborative learning and mentoring via apprenticeships. Instructional approaches persuade students act rather than listen, do things inside the technology world that are impossible in the real world, and link to outside resources and communities of practice. For more examples of interactive art and the communities, the sites create are alternatively called platforms or stations, that keeps the sociability of artwork remains closely linked to internet rhetoric. Yet, some researches debated on sincerity of relationship on the Internet that do not actually mirror a relationship in real; however there is potential, as in all reciprocal relationships, for revision and transformation through active engagement and totally immersive learning process.

In sum, social value can be cultivated by a process of contextual learning through interaction between cognitive and affective domains; achieved by instructional process from general to particular and from abstract to concrete, enhanced by a set of interactive media that range from cognitive & emotional arousal to an emotional reflection, which encourages high participation of learners via a ubiquitous technology such as phone and hand-held devices.

## 3.1 Purposes of the Study

1. To design a framework of "from a school to a community" and develop an interactive media for a ubiquitous learning community
2. To study an effect of interactive media to a road safety social awareness in a ubiquitous environment

## 3.2 Methodology

A mix method design is applied thorough out this study.
The first phrase of the project was to design a working model, using groundwork of "from a school to a community". A qualitative research approach was applied in this phrase of study. Documents of road safety projects that attempted to establish a road-safety community were analyzed, followed by a focus group of 12 groups of participants (pedestrians, traffic control, police officers, drivers, motorcyclist, public transportation drivers, school students, teachers, and university students), selected by an accidental sampling technique. Data were analyzed and propose to a group of twelve experts: Instructional Designer, Traffic authorized personnel, Social service personnel, Learning Psychologist, Educational Technologists, and school superintendants to reach opinions on a process of driving ubiquitous learning community

as well as an appropriate set of media for an online learning community.

The second phrase: an implementation of the model of a ubiquitous learning community consisted of three folds; (1) a media development, (2) an accelerate teacher training program, and (3) an establishment of a learning community. Mix method design included a process of Research & Development for media production, and a participatory research, that focused on the effects of the researcher's direct actions of practice within a participatory community with a goal of improving the performance quality of the community in this area of concern. The research involved in utilizing a systematic cyclical method of planning, taking action, observing, evaluating and critical reflection prior to planning the next cycle.

# 4 Results

The results of this study presented in two major findings

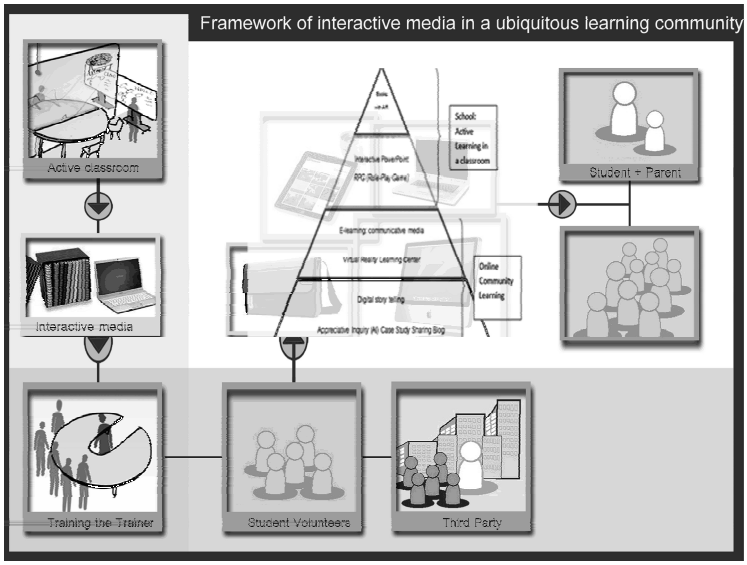
1. The framework of interactive media for a ubiquitous learning community
2. The effect of interactive media for social awareness in a ubiquitous learning community

## 4.1 The Framework of interactive media for a ubiquitous learning community

The framework of interactive media was designed based upon computer network and mobile technology, to support a school and community to learn in a ubiquitous mode. Media provide an opportunity for learners to actively learn in a classroom,

meanwhile are in favor to a community-based learning.

The framework comprised of three phrases of works to reach a goal of a ubiquitous learning community: a development of interactive media for social awareness, an accelerate teacher training network program with a challenge-based learning approach, and an establishment of a learning community in a ubiquitous environment.




### 1.1) A Development of interactive media for social awareness.

A set of media was designed based on a continuum of abstract to concrete learning experiences for a concept of, "from a classroom to a community". Media and a community platform were designed to support teachers, students and community as a virtual place where members can reach for road safety learning resources as well as can use as a place to communicate with other members. The media were developed accordingly: Book with Augmented Reality (AR), Wikipedia, Game based Learning, E-learning for media production, Virtual Reality Learning center, Digital storytelling Blog, and Appreciative Inquiry (AI) Case Study Sharing Blog.

**1.1.1) Books with an Augmented Reality.**

Two books of "Road safety and Social Awareness" were initially designed for students of level 2 (grade 4-5-6) and of level 3 (grade7-8-9). At the end of each unit, the books suggest series of activities that lead students to involve with their own community road safety issues. In addition to the suggested activities in the book, Augmented Reality (AR) technology allows teachers to scan an embedded AR maker in the book to a computer camera, that will activate a pre-set VDO clip to be displayed on a computer screen, which can promptly serve teachers to lead students to any learning activities.

For more examples, teachers , may use the embedded AR marker to activate a virtual 3D graphic simulation of "a motorcycle helmet" for students to immersive experience feeling of safety, when they see themselves on screen wearing helmet.

**1.1.2) Wikipedia of road safety integrated lesson plans.**

Teachers in seven major subject areas were trained to integrate a road safety content to their lesson plans, and based learning activities on their specific community context. All lesson plans and learning media are shared among teacher network.

**1.1.3) Active Classroom learning media – Interactive PowerPoint & Game-based Learning.**

A presentation software is a type of media teachers are most familiar with. About 60 interactive powerpoint templates were developed for teachers to use, modify content and design, and to share among network members. Using basic features of links and animations, the features of templates turn into a game-based learning media. This type of media requires an active participation between students and teachers to engage in a meaningful learning together.

**1.1.4) Road Safety Virtual Learning Center.**

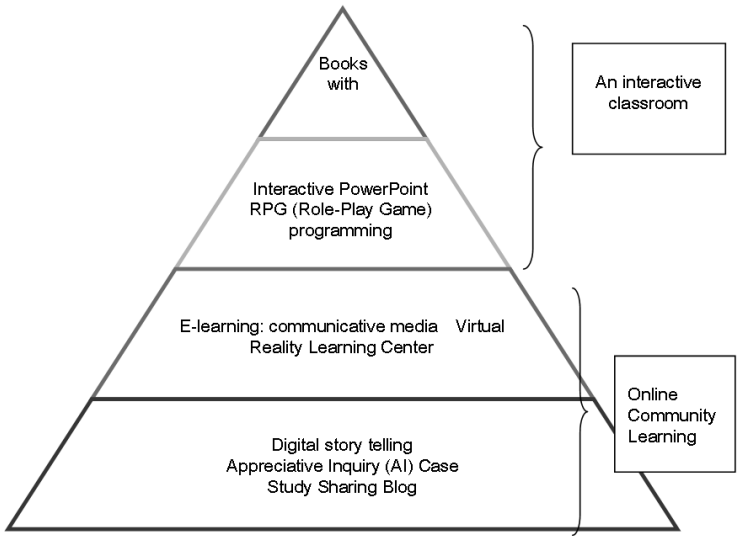
A Virtual Learning Center is built in a server, basically to provide a virtual learning environment, students and teachers access in an avatar form. Students can collaboratively learn from materials with others in the virtual environment. In an avatar

mode, students can create their learning bases by themselves and share with others. As if it is real, they talk, see and feel about what have happened in other communities.

### 1.1.5) Basic Media for road safety (E-learning).

E-learning of "hand-made media from recycle materials" are offered for teachers and students to produce a hand-made road safety media and communicate with others in their community.

### 1.1.6) Digital storytelling.




| | | |
|---|---|---|
| From schools | Game-based Learning | Wiki – Integrated Lesson Plan |
| | | Books with Augmented Reality (AR) |
| | | Interactive PowerPoint |
| | | RPG (Role-Play Game) programming |
| E-learning: Media developments | | |
| To a Community | A contextual learning | Virtual Reality Learning Center |
| | | Digital storytelling |
| | | Appreciative Inquiry (AI) Case Study Sharing Blog |

Picture, VDO, audio recorded from learning activities were collected, and later presented in a simple storytelling format, and uploaded to the community site to declare their active member roles of the road safety learning community.

**1.1.7) Appreciative Inquiry Case Study Knowledge Sharing.**

A media blog is set for students to bring in their own experiences of road safety issues in a format of cartoon drawing. The community site provides a simple tool for students to drag and drop, draw, or write a case that must be positively and emotionally impress to them. The rules of the discussion and sharing must be in a positive regard and aim at persuasive students' commitment to think and perform a proper road safety social value.

### 1.2) An accelerate Teacher training network with a Challenge-based Learning approach.

Samplings were 68 in-service teacher Volunteers from 25 schools in the central part of Thailand. The accelerate teachers training program was accordingly:

Step 1: Teachers worked together, designed and wrote an integrated lesson plans into the community Wikipedia. The lesson plan was to integrate a road safety issues into seven main subject content areas such as Mathematics, English, Thai, Social study, etc.

The result this step was found that a lack of teachers' skill in designing lesson plan and the use of technology. Those who had years of teaching experiences tended to have better skill in lesson design, but lacking of technological skills. This step was remedial by a peer coaching technique.

Step 2: Teachers returned to schools and deployed their lesson plans. They persuaded peers in school to re-design and implement activities that challenged studentsto examine their communities' road safety problems.

The result of this stage was found to be a lack of a commitment and supported fund to complete students' plan to complete. This step was revised; by using a coaching and mentoring system, as well as matching an external fund to support

the plan.

Step 3: Teachers with students collected evidences of learning progress in a digital format, such as still picture, audio and video recording by a mobile device. Later, all the digital archives were put together in digital storytelling format and published to the community learning web site.

The result in this stage was found that community platform is not user friendly for novice members. Some complicate functions such as VDO upload, security, and accumulated members' scores became an obstacle to this type of open community. The platform was finally re-designed to a simple, easy to use, and administered by the researcher team, in replaced to the previous community platform.

### 1.3) An establishment of alearning communityin a ubiquitous environment.

The final stage of the framework, focused on establishing a learning community via a ubiquitous learning approach. The Social Network Analysis was administered to invited students' network to an Appreciative Inquiry (AI) Blog, in order to expand to a ubiquitous learning community.

The result at this stage was found to be an incompatible technological issue, result to an obstruction for non-members (who were not familiar with the technology) to participate in this learning community. A face-to-face mode of group collaboration and discussion to storytelling cases was altered to an online AI Blogging. The discussion activity was recorded, and later uploaded to the community blog. A widely use of social network platform such as facebook was altered to the community platform.

## 4.2 Effect of interactive media to social awareness

The interactive media was introduced to 68 teachers from 25 schools and 124 students

located in the central part of Thailand. Ten out of twenty-five schools involved with the road safety community issues, and upload the clip of activities in a storytelling format.

Questionnaires were administered to two sampling groups.

1) Students, sampling in one school, to assess their opinions on road safety social awareness, and
2) A group of general participants in a community, to assess their opinions on road safety social awareness.

Five scales of students' opinions toward road safety social awareness in the classroom were 1 disagree, 2 somehow agree, 3 neutral, 4 agree, and 5 highly agree. The sam

**Table 1** Students 'opinions toward road safety social awareness

| Groups of items | *M* | *SD* | Meanings |
|---|---|---|---|
| 1. Receiving stage(Awareness) | 3.84 | 1.16 | Agree |
| 2. Responding stage | 3.58 | 1.12 | Agree |
| 3. Valuing stage | 3.29 | 1.20 | Ne |

**Table 2** Demographic

| Gender | No of respondences | Percentagge |
|---|---|---|
| Male | 23 | 52.30 |
| Female | 21 | 47.70 |
| **Total** | **44** | **100.00** |
| Status | | |
| Teachers | 16 | 36.40 |
| Students | 15 | 34.10 |
| Others in community | 13 | 14.50 |
| **Total** | **44** | **100.00** |
| Age | | |
| Under 25 | 24 | 54.50 |
| Between 25-35 | 10 | 22.70 |
| Between 35-45 | 7 | 15.90 |
| Between 45-55 | 4 | 9.10 |
| Above 55 | 2 | 4.50 |
| **Total** | **44** | **100.0** |

plings were asked to responded to 15 items based on3issues of pedestrian awareness, passenger awareness, and driver awareness to the road safety issues, represented 3 level of an affective domains; Receiving, responding, and valuing stages. The results shown in table 2, were found that the responses were in an agree level at the receiving and responding stages (Table 1); ($\overline{X}$ 3.84, SD 1.16 ; $\overline{X}$ 3.58, SD 1.12); and neutral in the valuing stage ($\overline{X}$ 3.29, SD 1.20).

There were 44 respondents; 52.30 % was male and 47.70% was female. Majority of respondents were teachers (34.10%). About half of the respondents was under 25 years old (54.50%), only a few was 55 years old (4.5%). (Table 2)

**Table 3** Opinions to the road safety social awareness in a Ubiquitous Learning Community

| Items | *M* | *SD* | Meaning |
|---|---|---|---|
| 1. Receiving stage (Awareness) | 4.57 | 0.50 | Highly agree |
| 2. Responding stage | 4.60 | 0.50 | Highly agree |
| 3. Valuing stage | 4.48 | 0.63 | Agree |
| 4. Organize stage | 4.47 | 0.50 | Agree |
| 5. Characterization | 4.48 | 0.55 | Agree |

The five scales of opinions to the road safety social awareness in a ubiquitous learning community were 1 disagree, 2 somehow agree, 3 neutral, 4 agree, and 5 highly agree. The samplings were asked to respond to 25 items based on3 issues of road safety, represented level of an affective domains; Receiving, responding, valuing, organize, and characterization. The results showed in table 3; the samplings responded to the road safety social value at the high level of receiving and responding stages ($\overline{X}$ 4.57, SD.50 ; $\overline{X}$ 4.60, SD.50); meanwhile they responded only agree to the valuing, organizing and characterization stages ($\overline{X}$ 4.48, SD .63; $\overline{X}$ 4.47, SD 50, $\overline{X}$ 4.48 SD 55).

# 5 Discussions

The effect of interactive media to a social awareness of students and people in the community was found to be at a receiving and responding stage, which went beyond the expectation of this study (receiving level). The affective result at these stages was because the active involvement of students to their own community road safety condition; together with social network in the community, they learned and shared experienced in a "cool" media. As stated by McLuhan that a "cool" media encourages the interaction of users; while the "hot" one does not leave so much to fill in or complete by audiences. Interactions with technologies allowed for active user control, yield an ability of users to participate in the creation or modification of a medium. Interactive media was not necessary to be mechanistic, yet invited and increased a level of collaboration and interaction (Margarett, 1998).

The interactive media for a learning community in a ubiquitous environment are discussed as they were in favor of an arousing affect to a road safety social awareness accordingly:

An interactive classroom media such as book integrated with Augmented Reality technology help increasing level of interactivity as a mechanical arousal. The books suggested activities that brought students to be involved with a real community road safety issue. Moreover, the simplest way that initiated an interactive class environment was a game-based learning, instead of a passive content transmitted by teachers. Wikipedia Road Safety integrated lesson plans encouraged teachers to lead students into an authentic task and being part of the community problem solving. With a challenge-based learning approach and self-learning materials collection supported students, teachers and community together learned and explored community's road safety (social awareness) issues. All lesson learn was shared among teacher network members. Forming a learning community was a major task to get members' emotional involvement; contents provided in the community web site for members to collaboratively learn, gave a prior cognitive process in which a variety of content discrim-

inations would be made and examined for their value and weighted for their contributions (Brewin, 1989). Coincided with Lerner & Keltner (2000), they stated that affect can be both pre and post cognitive, with thought being produced by initial emotional responses and further affect being produced by thought.

Furthermore,"An Accelerate Teacher Training NetworkProgram" in-services and pre-services Teacher Training, known for the most influencing group to the future of Thai youth, were initially offered to the volunteer teacher groups. Teachers were encouraged to deploy "A Challenged based-Learning", approach in their lesson plans, that required students to explore their community problems, discussed and found ways to actively involved with the issues. Involved with their community, students learned with an authentic task, and were formed a public mind; as teachers performing as a coach in a real world. Evidences of the works students and community together accomplished, were digitally collected in a VDO, with a technique of storytelling. Later, Students and community spread out the stories by telling and responding to each other in a E-Word Of Mouth (E-WOM) fashion, from anywhere and anytime, by any handheld or any computer devices.Ubiquitous learning community has been established with a support of a community platform (system), and via a RSS to a widely known social network -- facebook, which also allowed easy access from all types of computer devices; notebook, tablets, pad or smart/mobile phone. The Ubiquitous computing as known for itself can be a permanency, encourage the learning process to be taken place in a contextual situation (Chen & Kao, 2002). Learning could happen all around the learners, without being conscious of the learning process. Communities could connect and share experiences with a digital storytelling and react with a positive regard on an appreciative inquiry blog, or a virtual learning center. A persuasive video, as it has been said, was more likely to produce attitude change when post-viewing discussions were held (Zimbardo& Leippe, 1991), along with arousal and technique of self-reflection; it was postulated and confirmed by the study that could get members sense of community belonging and social awareness. This technique is relevant to Bednar&Levie, (1993) who confirmed three approaches: providing a persuasive message; modeling and reinforcing appropriate behavior.

# 6 Recommendation for a future research

According to the framework of interactive media of "from a Schools to a Community", learning community has been getting connected throughout Thailand. The corner stone of the white-road social value was established and will gradually strengthen the quality of life to be ready to the ASEAN community. The front road of Thailand will, in the year 2015,connect to the ASEAN community. Social science studies and this research found that interactive media were an ability of computer devices and software especially in a network environment that could encourage an interaction between users at the end of the computer terminal. Thai learning community, based upon techniques of "Challenge-based Learning", "Digital storytelling", and"Appreciative inquiry", were methods to deliberately share persons' values and thoughts that effected to users' affect. Further a research should be continued on the advantageous of communication via interactive media for aOne ASEAN multicultural diversity awareness.

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# Video Productions as Learning Resources in Students' Knowledge Building in the Ubiquitous Society

06


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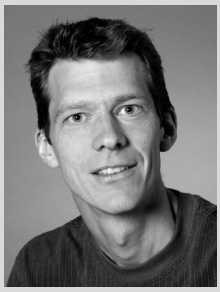

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## Abstract

This paper will investigate how video productions may facilitate students' knowledge building. The video productions in question may either be existing video productions directly aimed for educational use, video productions created in other contexts, but used in educational settings, or video productions developed by the students themselves. This is investigated from a theoretical as well as an empirical perspective, building on the authors' experiences from researching and teaching dealing with production of video in learning situations, with different learning objectives and didactic designs in mind. The paper will present an overview of the state-of-the art of research on using video productions as learning resources, followed by discussions of our own research results and practices. From the overview and the discussions concepts are defined and research questions formed, based on a multimodal perspective on teaching and educational design. We conclude by arguing where and why there is a need for more knowledge about video productions' potential as learning resources.

# Chapter 1 Introduction

Students and lifelong learners today have everyday life experiences using digitally mediated and multimodal ways of communication. In the ubiquitous society, where mobile and digital communication possibilities are present, these experiences constitute a basis for learning and meaning-making. Video productions are multimodal, as they comprise ways of representation like image, sound and text, which may be combined and interpreted in various ways. Through this multimodality, video productions hold potentials for developing multimodal educational designs, which may

be part of a broader approach with different modes to learning.

At the Research Programme on Media and ICT in a Learning Perspective, located at the Department of Education (formerly Danish School of Education, DPU), Aarhus University, synchronous and asynchronous digital modes of teaching and learning have been in focus. One such synchronous activity involving video is the use of video conference systems, where students and teacher can be online simultaneously, while being geographically apart. In this paper we aim to explore another, but growing area, in the utilization of video – the use of *video productions* in education. We investigate this from two distinct, but complementary perspectives:

1. *Students' use and re-use of teachers' or others' existing video productions*, e.g. as video streamed teaching sessions, interviews or lectures, or short YouTube video resources. Some of these may be created with the specific teaching situation in mind, others may be video productions originating from non-educational contexts.
2. *Students' use and development of own digital and multimodal video productions*, e.g. as video diaries, video presentations or video dialogues. These digital and multimodal video productions can act as a tool for reflection on theory and practice.

In this paper we will introduce a theoretical understanding of multimodality, didactics, and didactic design, followed by a state of the art of existing research on video productions pointing at relevant focus areas, concepts, and research results. After this, two empirical cases are presented and discussed, one on the use of video streaming of lectures across classes, and one on the use of students' own video productions as part of qualifying the students' professional practice.

# Chapter 2 Theoretical framework

The theoretical framework is based on a multimodal understanding of video productions as a conglomerate of different sign systems (speech, image, movement, gestures, and dramaturgy, see Krees & Leeuwen 2001). The concept of multimodality does not only relate to video, but is basically in play in all communication situations. The multimodal perspective is however highlighted through the use of the video media, where sound, image, temporality, and related sign systems are combined. The multimodal understanding of video productions supports the view that the interaction between different sign systems creates a synergy in the meaning making process. The concepts of multimodality, didactics, and ICT-based didactic design are discussed below.

The multimodal nature of ICT has led to the development of a concept of '*didactic design*'. The term denotes the implications of ICT being both an area of knowledge, a means for communication and a multimodal tool for knowledge-building. In this respect visual *decoding* and *meaning-making* are central areas of competence (Buhl & Flensborg 2011).

The emergence of ICT in education exposes the need to examine how teaching and learning situations come about in new ways. The approach taken here addresses a number of interconnected topics related to the field of ICT and learning, didactic design and the visual modality in education. In the following, we will firstly introduce the concept of *multimodality* in order to examine the visuals´ modal functions. Secondly, we discuss the notion of *ICT-based didactic design* in the context of certain trends in theoretical didactics from a Danish point of view. Subject-oriented didactics is seen as a *dynamic communicative practice* that evolves, thereby emphasizing the provisional and constructed nature of subjects.

## 2.1 Visuals and multimodality

ICT-studies have a rapid influx of new words and concepts. Digital technology has led to a need of describing the convergence of images, text and sound. This has taken various ways, one of which is the notion of multimodality (Kress & Van Leeuwen 2001). Multimodality means that the interplay between various modalities creates a synergy in knowledge-building. Kress & Leeuwen argue that meaning of signs is negotiated in social practices. This supports the idea that images may be interpreted as legible signs, i.e. their meaning can be translated into written or oral language (Kress & van Leeuwen 1996; Kress 2003). The embodied sense-based qualities involved in images and visualisations can however not be fully comprehended from a discursive perspective. Images and visualisations draw on their particular iconic systems of meaning perceived through form, lines, contrasts, colours, structures, textures, rhythm and composite qualities with embedded interdependent codes and culturally conditioned potential for construction of knowledge and meaning.

From a multimodal perspective, visuals are part of the synergetic knowledge construction as well as a specialised competence. Every time a teacher plans a lecture, she/he is given the opportunity to make text-based or verbal content choices but also to implement the learning potentials from integrating adequate images and visualisations (model, charts, diagrams etc). The academic field revolves about how to gain from the synergy of multimodalities in ICT-based designs.

## 2.2 The concept of didactics

The discussion of ICT-based designs for education follows from the continental tradition of theoretical didactics, where reflections of the conditions for educational activ-

ities go hand in hand with goals and content choices.

When the so-called 'father' of didactics Amos Comenius in the 1600's stated that the art of teaching is more than a God-given ability, he started the evolution of a discipline concerned with *how teaching can be transformed into knowledge through a particular communication practice aiming at changing the learner*. Both philosophers and educationalists have addressed the topic ever since, in an attempt to find the best way to conduct education. The educational philosopher Johan Friedrich Herbart, who is considered to be the originator of theoretical didactics in the 1800's, introduced the teaching-learning situation as a case of three components: the teacher, the learner and the subject matter – later called the 'didactic triangle'.

The word and concept of *didactics* itself is the cause of an ongoing discussion between scholars who are rooted in continental and Anglo-Saxon traditions respectively (Hopmann et al. 1995). The very word didactics causes misinterpretations between the two traditions, because the continental approach addresses the entire context of an educational situation, while the Anglo-Saxon approach is more likely to regard didactics from a methodical point of view. This discussion will not be elaborated further here, but is well described in *Didaktik and/or Curriculum* (Hopmann et al. 1995).

The didactic triangle is interpreted in many ways, and it can be criticised for a lack of contextualisation in social, cultural and psychological considerations as well as organisational and institutional framing. It may be seen as a weakness in a contemporary context, where the conditions for every social practice must be negotiated and nothing can be taken for granted. However, this weakness might as well turn into an advantage since ICT raises questions of placing and displacing teaching and learning spaces, changing contexts, and synchronous and asynchronous time spans force the educator to reconsider the didactic framework.

Supported by the theoretical logic of the German sociologist Niklas Luhmann's sys-

tems theory, didactic emerges from the specialised system of educational communication (2002); a system that reproduces itself, and, from a systemic logic, gradually evolves because of communicative incidents in the system (Luhmann 1993, Buhl 2009a). Luhmann's theoretical framework of communication has inspired Danish educational researchers to reframe the didactic triangle and to re-interpret the triangle as an interaction-system of communication where teaching takes place and learning becomes possible (e.g. Rasmussen 2004, Mathiasen 2002).

Another interpretation is proposed here, where the combination of Luhmann's framework of specialised communication practice and the actors of the triangle (teacher, learner, subject matter) constitute a particular subject. In this perspective, the constitution of a subject takes place every time the specialised communication practice is performed within the educational system.

Taking the evolutionary logic of systems into account (cf. above); subjects are dynamic. They are negotiated every time teachers, students and a subject matter communicate. The triangle becomes dynamic and changes over time. A subject in 2011 is not the same as it was 200 years ago. From this systemic perspective education may, in principle, take place everywhere – at home with a computer or in another country, day or night, as long as the education communication practice is possible. It becomes possible via ICT. This supports the idea of ubiquity where learning takes place everywhere.

## 2.3 ICT-based didactic design

The emergence of ICT has given rise to discussions of education in terms of didactic *design* in research groups in Sweden and Denmark (Rostvall & Selander 2008; Selander & Svärdemo-Åberg 2009; Andreasen et al. 2008; Holm Sørensen, Audon & Levinsen 2010; Buhl 2008b and Buhl 2010). The concept of design is gaining

ground outside the traditional fields of engineering, craftsmanship, fashion and graphics as well as in Anglo-Saxon educational research that emphasise the practical interaction.

When design is connected with didactics – in the broader sense of the continental tradition – it becomes possible to emphasize didactics as *a dynamic* communicative practice. Thus, the theoretical didactics must be reflected in another way. Subjects develop and evolve. For instance, visuals become a particular mode in the complex of ICT that necessitates a set of competences that facilitates multimodal learning patterns.

When the teacher turns into an ICT-didactic designer, the field of competences change. The Norwegian pedagogic philosopher Erling Lars Dale introduced three levels of competences (C1, C2, and C3), which constitute the professional educator (1989). His main idea is that the professional educator develops from the ability to practice the profession in the situation of a teaching and learning process (C1), plan the process (C2) and reflect on the process on a theoretical basis (C3).

The three levels of competences represent three different contexts of practice:

C1 – Practice: Representing a here-and-now-situation. This implies a need to act in the situation.
C2 – Planning: Representing considerations and goals for C1. This implies a lesser need to act, and makes it possible to consider a given situation.
C3 – Theoretical reflection: Representing theories on situations that may occur. This implies no concrete need to act.

Video streaming places the visual images of the video in centre of the perceptual experience and results in an increasing interest in the performative aspects of the teaching practice. It becomes clear that the implications of implementing ICT creates a whole new agenda for the teacher, not only in regard to roles such as be-

ing a facilitator and moderator of digitally based working processes instead of a lecturer in an auditorium (Buhl 2009b), but also in regard to the functions and the different actors involved in the three competence levels of an education process (Buhl 2008a, 2008b). When e.g. implementing video streaming the teacher's planning (C2) and practice (C1) is changed from an individual exercise to a corporative practice that requires staff with technical as well as media competences for the process to work.

The new functions of the teacher, however, go beyond that. In all kinds of learning processes where ICT is involved there appears to be a re-mediation, not only in relation to the means for communication (Bolter and Grusin1999), but also of the conditions in which the professionalization takes place. Most digital learning applications or digital technologies imply a reorganisation of the teaching and learning situation. Whether it is the design of a learning process with mobile devices or software to computers, the designer faces the didactic challenge on all three levels: to practise, plan and evaluate outside the traditional (physical) framing of an education institution.

# Chapter 3 State of the art of research

## 3.1 Use of existing video productions

In relation to *students' use and re-use of teachers' or others' existing video productions*, there seems primarily to exist research relating to video produced with educational use in mind, produced by professionals as well as amateurs. It is also

possible to find sources on YouTube as a people's phenomenon (e.g. Wesch 2009), but not relating to 'didacticizing' resources produced in other contexts than formal educational contexts.

Through the development of the possibilities in web 2.0 some professional productions are made available via technologies, where sound or video files can be streamed online or downloaded through podcasting or vodcasting ('video-podcasting') (McKinney, Dyck & Luber 2008). Simultaneously new opportunities for distribution of amateur productions have emerged. With light video cameras and smartphones, even teachers with limited technical abilities can handle producing and distributing their own internal materials online, to be accessed through restricted as well as open websites. These digital productions appear as learning objects, i.e. digital resources that can be used and re-used to support the learning process (Wiley 2000, Koohang 2004).

More professionally produced teaching videos demand a team and equipment, and the involved persons often act based on a manuscript (Heilesen & Pedersen 2010). Professional recordings require the team to adjust their recording practice to the actors' context and the purpose of the session. Interestingly, the team hereby affects the mediated interpretation of the teaching and the role of the teacher. When to zoom, and what does zooming mean for the mediation of the subject in question? Through our own practice, it is clear to make a difference (Buhl 2008a, 2009b), which it will be relevant to explore closer.

Even though streaming video of lectures is becoming more commonly spread, studies on how they as learning objects affect the learning processes and operate pedagogically are seldom and are often limited to participant evaluations or studies on teachers' unwillingness towards being professionally distributed through streaming video (Hew 2009, Lazzari 2009, Dalsgaard & Godsk 2009, Heilesen 2009, Rattleff 2008, Rattleff & Holm 2009). Some research shows that teachers making use of video have a tendency to act as if the teaching situation only took place in a traditional

physical space (Fritze 2004).

In a review Schlosser (2006) shows that the use of podcasts is dominated by lecture recordings. Students seem to find as well streaming as podcasting of lectures useful, when they cannot be physically present, but also students present at the lectures seem to use the recordings for repetition of specifically difficult topics (Evans 2008, Dreyfus 2009), or more generally to obtain a better understanding of the content (McKinney, Dyck & Luber 2008). Some researchers are skeptical to the educational value of podcasting, where others find significant improvements of students' grades through podcasts compared to lectures and text books (Lazzari 2009). According to Lazzari, most studies report podcasting to be pedagogically neutral, but with an educational potential. Honey & Mumford (2006) find that podcasts support students with an auditive learning style, while students with a visual learning style can benefit from vodcasts through noticing the body language of the teacher. Preliminary studies by Ørngreen, Soelberg & Yssing (2004) show that the composition of student groups according to learning styles seem rewarding, however the teaching also ought to challenge the students on other learning styles than their preferred.

## 3.2 Development of own video productions

In relation to *students' use and development of own digital and multimodal video productions*, we understand production of video as a driving force for reflection on the subject of the teaching at a given time, theoretically or practically. Relevant examples are master students' video recordings of their own professional counseling practice for analytical reflection in an academic context (Buhl 2011), and other students' recordings for an ePortfolio as inner dialogues on the subject content (Ørngreen 2009).

Under some circumstances students may have access to produce video with professional support. Juliet Fall (2011) describes how the University of Genève accepts master theses in Geography made as semi-professional videos instead of traditional written reports. Before the video productions the students had received intensive training and professional support. The study, however, does not state results regarding educational results.

In other circumstances students produce own content through smartphones or light digital video cameras, and edit using freeware or pre-installed programmes, web 2.0 services or smartphone apps. There is no doubt that students are engaged when producing their own material, but further research is needed regarding how the production processes affects the learning. Lee, McLoughlin & Chan (2008), Miller (2006) and Cebeci & Tekdal (2006) emphasize that sound and podcasting have a value in relation to knowledge construction and the possibility of distributing student generated content. Atkinson accentuates that students seem "to be learning through *creating* podcasts and similar, in contrast to learning *from* podcasts" (Atkinson 2006, p. 21, italics in source). It is generally accepted that students learn and construct knowledge through externalizing and materializing ideas through products, and many studies of collaborative production processes show that the combination of (re-)negotiation of meaning and (re-)organizing of materiality facilitates reflexivity and the learning of a subject content (Brown, Collins & Duguid 1989, Salomon 1993, Lave & Wenger 1991, Sfard 1998, Davidson & Sternberg 1998, Dillenbourg 1999, Hollingworth & McLoughlin 2005, Lee, McLoughlin & Tynan 2010, Sørensen, Audon & Levinsen 2010).

Only few studies examine learning processes related to student production of video (McGarr 2009). Smith, Sheppard, Johnson & Johnson (2005) and Lazzari (2009) found a significant improvement of students' exam grades when producing their own educational content, and according to Lazzari also the students' ability of critical thinking increases. Lazzari concludes that this method are appropriate at least in courses relating to multimedia, communication and production.

# Chapter 4 Empirical cases: Research results and practices

We will now introduce two empirical cases from a Danish context on using video productions in education. Regarding students' use and re-use of existing video resources, lectures and teaching sessions have been video recorded and streamed, and the experiences are discussed in 4.1. Students seem to benefit from the video resources, and by being able to pause, repeat and control the video, they use them to support their learning process. Regarding students' use and development of own multimodal video productions as tool for reflection and learning, professional counselors are as students involved in producing their own video material for analysis, as discussed in 4.2. The students are using the production of video to reflect on and qualify their professional practice.

## 4.1 Video streaming of lectures to students from other classes

During five years video recording and streaming of teaching and lectures have been used across different classes at the Supplementary programme in preparation for the Master of Arts (Ed.) in Educational Psychology (Rattleff 2008, Rattleff & Holm 2009). In this case focus will be on experiences from the students' use of the video streamed resources.

The idea of 'video streaming' is related to pod- and vodcasting, but is another way of distributing video resources. In both cases we are dealing with video recordings of teaching situations, lectures or other teaching resources that the students can have access to outside the classroom, when and where they need it. The difference between

'-casting' and '-streaming' lies in the way of getting access. A podcast or vodcast can be viewed directly on the net, but can also be downloaded to a computer or mobile device, so the student can bring the recording with her/him. In contrast, a streamed video recording may 'only' be streamed, i.e. viewed directly on the net. It cannot be downloaded, copied or distributed further. Therefore video streaming demands internet access, when the recording is viewed. But apart from this difference, the two modes of video streaming and pod-/vodcasting holds the same possibilities for students to pause, fast forward, repeat or jump in the recordings, while viewing them.

The specific initiative on video streaming actually began as a structural change of the supplementary programme. Instead of having the same class being 'doubled' and taught twice in two alike classes, one in Copenhagen and one in Aarhus (two big cities of Denmark), from 2006 and onwards one class was established as a class with physically present teachers and students, and one class was based on ict-based communication.

The physically present class took place in Copenhagen and had the same structure as earlier, with the difference that the lectures on the teaching sessions were recorded on video. The ict-based class had access to these video recordings through the e-learning platform of the university, and its structure was built around these recordings and a number of activities in relation to them. Each video recorded lecture was thus followed by written, asynchronous online discussions in the week after each lecture.

Since the students on the ict-based class had no fixed dates with teaching sessions, a couple of non-compulsory gatherings were organized during the term. These gatherings took place in the city of Aarhus.

Before the implementation of the new structure, some concern was raised from students and teachers. Students were concerned about the quality of learning at the

ict-based class, and about maintaining a lively learning environment. Teachers were concerned about whether the video recordings would lead to more passive students, and whether the recordings would be re-used, making the teachers unnecessary in the long run.

However, when the ict-based class began, the initial concern changed to enthusiasm. The students were pleased with the time and space *flexibility* that the video streaming gave them (the following quotes are from students' statements in the written, asynchronous, online discussions at the course): that they "could sit at home and watch the lectures", "Sunday afternoon – Monday evening etc. , whenever it fits into my life", to be able to "check out the discussions, when I work the night shift, as I do now", or "that I now, sitting in Athens [..] nevertheless can follow".

Even though the video streaming initially was only meant as a support for the ict-based class, the possibility of access to the recordings were opened for both classes, when the students at the physically present class early in the term expressed their need to do so. Instead of just acting as a piece of "scenery" in the video recording for the other class, they were themselves involved in the use of the video resources. And both groups of students had benefits from viewing and reviewing the teaching sessions.

Besides the flexibility mentioned above the students were also satisfied with the special way of studying that they developed in relation to the video streamed lectures. This includes *repetition*, which in itself raises further associations or deeper concentration on the subject: "Sitting at the lectures I write notes, and when I see the lectures again on video I realize that I missed several sentences and details, because I was busy writing notes. This way it is really useful to see or listen to the teaching session again on video", a student from the physically present class writes. A student from the ict-based class was happy to "stop the lecture just to write down a note, or rewind and listen a few more times to a part that I first didn't grasp [..] or if I get tired [..] go get some coffee."

Generally, it is the possibility of *being able to control* the flow of the video – to fast forward or rewind, pause, repeat, take notes, and take time to further reflections – that separates studying with video streamed lectures from sitting in a classroom. A student describes the newfound flexibility that one day when the train was late and she/he decided to work at home: "I would rather have a reading day, knowing that later I can see the teaching session together with notes through the web, than have a day [in the classroom] ending in frustration that half of it went above my head, while I tried to catch some of it."

All in all, the students at the supplementary programme in preparation for the Master of Arts (Ed.) in Educational Psychology employed meaningful learning strategies in relation to the video streamed teaching resources. The students have the possibility to control the flows of the teaching themselves, so that the pace and the pauses suit them. The students' use of the video streamed recordings, where they work active and mentally reflecting with the specific subject, give them an experience of enhancing their learning process. Working with the video resources the students establish their own study room: Each one can view and re-view the teaching, pause and rewind as they like, and thereby gain time to process, write further notes, and reflect on the subject at hand. It is possible to take into account individual needs, if a student needs a pause for further reflecting or dealing with the content of the teaching.

However, the teaching in the physically present class was to some extent also affected by being recorded. The setting of the recording changed the teaching sessions to be planned more like traditional lectures, and only after the recording was finished, there was room for questions and discussions. A tendency was also observed that the students present posed less questions during the teaching while the camera was turned on. Video recording of teaching sessions thus gave benefits as well as drawbacks, which will be relevant to investigate further.

## 4.2 Video productions as qualification of students' own counseling practice

Working with students' own video productions will add new opportunities for the facilitation of learning processes. This is becoming more possible and more relevant in light of the ubiquitous nature of ICT. A specific use of students' video productions takes place at a Danish Master of Counselling programme. A course in the programme involves video production and analysis of the student's own practice as a means to develop their counselling competences.

The Master students already work as professional counsellors in different educational institutions all over the country, but have no knowledge of integrating the use of video in their professional work. They are typically trained teachers, nurses or academics who have segued into counselling, and they come to the programme to add an academic degree in counselling to their professional achievements. This means that they have a lot of practical experience to draw from, but at the same time that they have also developed unconscious habits and ways of counselling, e.g. in the way they address their clients, their body language, the whole setting of the counselling situation. The study programme provides an analytical element to the counselling practice and thereby a development of the students' professional skills.

During the course in question, the students are taught in production and analysis of video. They are going to video record and afterwards analyse an actual counselling situation with themselves performing as counsellors in an everyday situation from their professional practice. The first step is to invite one of their actual clients to participate in a counselling session, which then is recorded on video camera from start to finish. The next step is to make the resulting video into an object for analysis. Later, the video is analysed on the basis of various academic theories about multimodal approaches. Questions about the artificiality of performing in front of a camera and the significance of culturally defined media competences are addressed.

Kress and Leeuwen (2001) also addressed this issue from the perspective of multi-modality and the students are encouraged to draw on their approach, both when they plan and when they analyse their own video production. The approach comprises four dimensions of the multimodal communication as a tool for analysis:

- *Discourse* which posits that the perception of reality is socially constructed. The video exposes this and provide the Master students with an opportunity to examine their own professional practice from different perspectives. They may, for example, see how clients become nervous when they enter the counsellor's office.
- *Design* which addresses the development of a concept in order to establish a certain discourse. In this phase, the students may examine the conceptualisation of the counselling situation, which may call for a redesign. If, for example, a Master student wants to establish a relaxed atmosphere in the office, he or she may decide that the counselling situation should take place in a setting that resembles a living room.
- *Production* which denotes the actual articulation of the design. The students analyse and improve the mise-en-scene of the counselling. They may, for instance, put in a sofa instead of the office desk or alter their own physical appearance by changing clothes.
- *Distribution* which denotes the choices of media for storage and dissemination of the negotiated meaning-making emerged from the situation. In the particular case the choice of video has already been made.

Kress and Leeuwen did not categorise the phases of the multimodal discourse with educational purposes in mind or to enhance E-learning activities in particular. They investigate (the construction of) meaning-making in human communication situations as such. Their social-semiotic approach, however, is valuable for discussions about the learning potential of multimodal uses of video. The challenge is to identify the multimodal learning potential. To the students, Kress and Leeuwen are used for small-

er analytical exercises during the teaching, and as a preparation for their own production. The multimodal approach gives a focus on all visual, auditive, and material signs involved in creating the situation.

When the counselling situation is made an object for investigation, the Master student is given the opportunity to approach routines of his/her profession from a new angle. The Master students learn about professional counselling by doing it and by reflecting on it from a distance. The Master student also has an embodied experience of being in the counselling situation that he/she later turns into an empirical object for analysis and interpretation. This adds a sense-based dimension to the social semiotic discourse. Furthermore, the situation brings about the embodied experience of atmosphere and reactions like surprise, anger or laughter which emerge from the situation itself (Buhl 2009b). The video observation and -analysis creates dialectic relations between discourse and embodied experience, and the Master student is given a key to improve a professional practice, i.e. counselling, and a method to conduct multi-modal research.

The crucial point regarding the video analysis is that the counselling situation that the students are going to record and analyse, involve themselves as counsellors. The students are going to handle two situations: One is to use the video media to investigate a practice and handle the research methodological aspects involved. The other is to handle a practical situation, where they act as informants in a counselling situation in front of a video camera.

Seeing this as a didactical situation, the challenges can be reflected through Dale's levels of competences (cf. earlier). Through the recording of their own practice the students shall handle maintaining the practical counselling situation (at the C1 level), and at the same time collect data in order to reflect the situation on the C3 level (Dale 1989). This exercise provides new knowledge of the counselling process and the students' actions as professionals. By using the collected data for analysis, the students can work with a particular situation, analyse their own behaviour as pro-

fessionals, analyse the interaction and communication with the counselled and reflect how to improve their own professional practice. The knowledge forms the basis for planning and framing the considerations and goals for C1, which are considerations on the C2 level. The video production expands the field for working with the experience and design of a counseling situation.

Video observations are a well-known qualitative method, but even though video is multi-modal, video analysis is often analysed as verbal conversation without taking the other modalities into account. In this situation the multimodal approach enhanced the analysis of the dialogue with analyses of bodily interaction, gestures, facial expressions, ritualisations, or when the material artefacts of the room became parts of the situation supporting different roles (Goffmann 1959).

The present case exemplifies the learning potential of a multimodal approach with regards to analysis, understanding and change of a professional counselling practice: Firstly, the four dimensions developed by Kress and Leeuwen allow us to identify significant aspects of a situation and act on them. Secondly, the so-called tacit knowledge (Polyani 1969) is taken into account; this comprises a methodology that bridges embodied presence and analytical distance to empirical data, or *a theory-generating practice* (Buhl 2003, Buhl and Flensborg 2011).

The learners gain knowledge in the intersection of doing, experiencing and reflecting on the basis of theoretical knowledge (ibid.). The approach of theory-generating practice puts the learner's practical skills and competences into the centre of attention and forms the basis for knowledge building. The theory-generating practice draws on a multimodal approach where symbol systems as well as sense-based experience come into play. The theory-generating practice conducted and reflected from a multi-modal approach could be the key to design educational programmes to professionals who need to participate in a lifelong learning process.

The case exemplifies how digital technology does more than just overcome distance. New ways to create learning situations emerge from the integration of video into a course. Experiences from a multimodal approach to video production can potentially be transferred to other aspects of e-learning.

## Chapter 5 Conclusion

As it occurs from the state of the art and the empirical cases in this paper, a number of publications can be found on the use of video productions as learning resources, however many of these are based on pilot studies. There is thus a need for thorough and deep collection of data and further analysis of the various learning potentials. Relevant research questions are: How do students specifically work with existing and own video productions, individually and in groups? How can video productions act as meaningful resources in students' learning processes? What types of knowledge, abilities, and competences, and which ways of collaborating are involved?

In this paper we have discussed theoretical perspectives on didactics, multimodality, and a status on existing research on use of video productions in education. Further empirical studies and development of methodological questions, e.g. regarding how to study use of mobile technologies, will bring the research-based knowledge of the field forward.

Using mobile technologies, students can study at a café, at home, during transportation, etc., and video can be produced in open environments. A methodological challenge in studying this is to involve students not only as informants, but also in the creation of the information used to study their ways of learning. Possible empirical approaches can be cultural probes, mobile probes, or digital storytelling

(Ørngreen, Andreasen & Levinsen 2010). Through such methods learning activities may be followed, where the setting is not necessarily the physical institution. It may contribute with knowledge on how learning activities unfold among students or learners in the ubiquitous society, and what implications this may have for the establishing of study environments and the design of education.

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# Deeper Analysis and Comparison of Slovak e-Learning Best Case Practices Related to Higher Education in a Ubiquitous Society

07

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## Abstract

*As e-learning and distance learning tend to get more and more important for all kind of organizations, researchers and practitioners, the search will try to bring a critical analysis of both — the negative and positive sides of main e-learning players in Slovakia in transition to a ubiquitous Internet society.*

# 1 Education in Slovakia and its historical background

Slovakia had a tradition of academic and scholarly endeavor in the mainstream of European thought and a history of higher education dating from the Middle Ages. The Universitas Istropolitana (Academia Istropolitana) was founded in Bratislava in 1465. Traditionally, Slovakia has had high levels of education. Literacy in Slovakia is almost 100%. According to latest Eurostat statistics the population with completed secondary education reaches 91.5 %. This fact greatly affected and is still affecting the routing and total development of the educational system of Slovakia. Despite of the whole world's move toward the technologies of education, as those which use ICT, there is one statement at the place, and so that the Slovak school system is still holding on the old trends.

# 2 Role of distance education in the country

In fact, the importance of distance learning or distance education (DE), as the precursor of e-learning, for adult education in Slovakia has never been very big, as even the role of DE in Slovakia is arguable.[1)] As we describe in following text, specially the nineties were the era of boom of the DE in Slovakia thanks to a big multi-country Phare project started in 1994. Project had two phases and finished in 1999. Five different local Centres of DE have been established within this project, all of them as so called "special purpose units" (local DE centres) at the following Slovak Universities: Slovak University of Technology in Bratislava, Technical University in Zvolen, Technical University in Kosice, Slovak University of Agriculture in Nitra, and University of Zilina. All of these centres were coordinated by the Slovak National Distance Education Centre based in Bratislava at the Slovak University of Technology. City University Bratislava acted as a methodological centre for the DE Centres in Slovakia. After the end of the Phare project the Centres tried to cooperate and establish a solid base for DE provision. Most of them concentrated on provision of DE courses within further education. Only three of the centres have participated actively in the provision of DE university graduate courses at their home universities (University in Zvolen, Zilina, and Bratislava). Despite of the universities becoming the leaders in the input of the new technology of education, and also gave it great base for implementation. But however, thanks to the facts which were already mentioned and by the impact of historical evolution, the centers where the DE was created were ruined by the management of universities. If we take a think about the question, why was this technology implemented in universities, the answer would be: because universities were in post-revolutionary era (after the velvet revolution) considered as the in-

1) Paulsen F. M. (2007).

stitutions that presented advance. Today, we must unfortunately allege that the ambition for modernization gradually subtilized, and universities came back to the old traditions, which were also supported by Ministry of Education, by its attitude to law-making.

Although universities became leaders in introduction of new technologies in education and in preparation of a solid base for its implementation, due to the above mentioned facts and effects of historical development, university management, where arose centers for DE, gradually destroyed these existing centers.

If we reflect on the question of why this technology has started at the universities, the answer would be: universities were in post-revolutionary period (after the Velvet Revolution) institutions presenting the progressiveness. In higher education the ICT infrastructure was much better developed than the other parts of the Slovak educational system. From 2002 e-learning has become important teaching method in specific subjects at some universities. But the level of e-learning implementation still depends on the activity and professional experience of individual departments at universities.

Today we must unfortunately conclude that efforts to modernization have gradually faded and universities returned to their "*stone rules*". This trend was also supported by the tendencies of the Ministry of Education in its approach to lawmaking. In the case of DE and Life-Long Learning (LLL), there has been no clear state strategy effort and the ending of the projects create many problems for LLL strategy in Slovakia. In comparison with other EU and OECD countries, only Slovakia has seen little systematic government support.[2)] All of the above mentioned Centres provided also LLL education courses in DE form (mostly short term), where the number of students varied.

Supply of e-learning is currently not very sufficient yet, however statistical data demonstrate interest of the public. In general, there is an interest in e-learning services, especially in courses leading to international certificates. Actually not every course which is marketed as an e-learning course is a "full fledge" e-learning course[3)]. Using the term full − fledge in quotes course we would like to stress

2) Druga, P. (2008).

fact that some courses have e-learning only in volume title. It partly concerned e-learning courses or even so to called e-learning courses which had nothing common with the e-learning principles, especially when compared to e-learning standards abroad (e.g. in Germany which already in 90's showed a big rank.). Having said this, we can take the fact that the universities undertook the difficult task with the introduction of DE technologies and then e-learning. As already mentioned in previous text, it was a logical outcome of post-revolutionary sentiments, when the whole situation in Europe actually helped make the universities apply new technologies and become the vanguard of the latest testing technology education.

Moodle as a free course management system (CMS) started to be used at many Slovak universities. At this moment it is hard to say something about the efforts of super ordinated institutions to evaluate and ensure the quality of e-learning because e-learning is still not yet wildly implemented. Preparations of recognition and validation of both non-formal and informal education are partially slowed down due to resistance of representatives of formal education who foresee the risk of weakening of position of schools in this agenda but predominantly due to insufficient discussion on advantages it provides for citizens as well as for the employers. Despite some positive experience especially from the private sector, the development of necessary methodologies is only at the beginning. However, through the national project the ministry of education tries to create and introduce a system framework for horizontal permeability in the framework of the system of LLL, which should result in drafts of respective legislation.[4)]

3) Full-fledged course = having a full qualification, credentials or preparation.

4) Ministry of Education of the Slovak Republic. (2010).

# 3 Information and communication technologies

Information and communication technologies (ICT) has proven to be a key enabler of socioeconomic progress and development, enhancing productivity and therefore economic growth, reducing poverty and improving living standards in many ways. ICT is increasingly revolutionizing production processes, access to markets, and information sources together with social interactions. ICT also has an impact on government efficiency, fostering transparency and better communication and services with and to citizens.[5)]

While the ICT sector in Slovakia has been a source of growth in recent years, notably due to foreign investment, there remains a sizeable challenge in terms of improving access to and take up of ICT technologies if a fully inclusive information society is to be achieved. Indeed, Slovakia is ranked in 43rd position, out of 134 countries, in the 2008-2009 Networked Readiness Index (NRI), which measures the degree of preparation of a nation or community to participate in and benefit from ICT developments.[6)]

Slovakia has an overall low level of connectivity, but Slovak citizens are active Internet users within the limits set by the infrastructure. Household take-up of broadband and overall Internet connectivity is among the lowest in Europe. Usage levels are higher than the connectivity would imply, and not far from EU average. Reading news and magazines online is particularly popular.

This can partly be explained with the high frequency of Internet use outside the homes, at Public Internet Access Places, in schools and at work. Despite the popularity of music and games downloads, the low broadband penetration does not permit the development of a commercial market for online content. Digital television is in its

5) European Commission (2010).

6) Dutta, S., Mie, I. (2009).

infancy as well.

**Table 1** Internet access by households (%)

| | Internet access | | | Broadband | | |
|---|---|---|---|---|---|---|
| | 2006 | 2007 | 2008 | 2006 | 2007 | 2008 |
| EU27* | 49 | 54 | 60 | 30 | 42 | 48 |
| Slovakia | 27 | 46 | 58 | 11 | 27 | 35 |

* Excludes Belgium (data were not available)
Source: Eurostat, 2010.

**Table 2** Activities carried out on the internet (private purposes, (%) of all individuals)

| | Travel and accommodation services | Internet banking | Interacting with public authorities | Reading online news, newspapers/ magazines | Ordering goods or services | Looking for job/sending application |
|---|---|---|---|---|---|---|
| EU27* | 32 | 29 | 28 | 26 | 25 | 13 |
| Slovakia | 29 | 24 | 30 | 34 | 13 | 13 |

* Excludes Belgium (data were not available)
Source: Eurostat, 2010.

The development of the Information Society is one of the policy priorities of Slovakia.[7)]

- *e-Government*: The Central Public Administration Portal was put into limited operation; electronic procurement systems and electronic signature projects have been furthered; several studies on future ICT measures have been prepared (including a system for electronic data exchange among registers, a personal embedded chip ID cards and free access to the land register). e-Government services are not yet widely available online in Slovakia but citizens and enter-

7) Ministry of Education of the Slovak Republic. (2010).

prises use of basic services is above the EU average and close to average for advanced services. Enterprise service use has grown especially fast. Availability of broadband and computers in school are low but teachers use computers for teaching more than availability would imply. ICT skill levels among employees are unequal: For expert skills, Slovakia is above EU average whereas basic user skill levels are among the lowest in Europe. Connectivity among enterprises is slightly better than in households but at the low end of the European scale. Enterprise use of eBusiness applications and e-Commerce is low, with the exception of e-Signatures.

- *Digital Literacy*: ICT issues are being included in the curricula at all levels of education, teachers have been given training on the use of ICT in the educational process and schools were provided with some necessary infrastructure. To promote digital literacy the "Stur's Movement" project has funded ICT training for local communities.
- *eBusiness*: some legislative actions were undertaken to support electronic commerce and developments in electronic communications.

Key challenges for developing ICT:

- Investigate the potential for supporting programmes of support for ICT development involving large foreign investment firms, smaller local ICT companies and leading research teams;
- Multiply the number of public internet access points to overcome cost related impediments to the information society;
- Pursue the implementation of the national broadband strategy.

# 4 E-learning and information and communication technologies integration

The area of e-learning belongs to the responsibility of the following institutions:

- The Ministry of Transport, Posts and Telecommunications, as an integral part of its responsibility for the Information society – valid only until January 2007;
- The Ministry of Finance, as an integral part of its responsibility for the Information society – valid since February 2007;
- The Ministry of Education, Science, Research and Sport (general responsibility for education including LLL).

Since November 2004, the Government has appointed the Plenipotentiary for the Information Society. In the area of e-learning the Plenipotentiary plays an important role in necessary supporting activities and can influence the intersectoral coordination or discussion of relevant problems.

There has been no specific Government policy document directly dealing with the e-learning area adopted yet. However, there are two main policy documents: Government Program Declaration and National Information Society Policy that define Government's policy on e-learning.

After the general elections in June 2010, the new Government and Parliament adopted the National Reform Programme of the Slovak Republic for the period 2011-2014. The plan aims for a friendly government that meets citizens' needs; intelligent land that bring intelligence to the national infrastructure facilities; regenerative economy that strengthen competitiveness of existing industries; secure and safe social environment; and tailored u-life services that provide customized services for individuals. To meet these objectives, implementation strategies and actions are provided.

The LLL strategy is being reviewed and updated. It will mainly include measures to systemically reduce information asymmetry in further training. Creating freely ac-

cessible educational content will raise the level of citizens' key competencies, facilitating their opportunities in the labour market. Support will be given to further training activities that target personal development and an improved quality of life.

At present, in Slovakia the main positive impact of e-learning on the education system can be seen in tertiary education, which is characterised by the highest level of e-learning projects already implemented.

A gradual positive impact can be observed also in training at workplace by big companies and in the LLL system provided by universities. Currently, most interest seems to be in courses that are internationally certified.

Universities, some private education institutions and large enterprises (mainly with foreign investments) are the most active in the development of e-learning services in Slovakia. Public administration, primary and secondary schools and SMEs are still lagging behind. However, universities fall behind in e-learning content management, since human resources in this area require heavy funding, which cannot be covered by grants and state subsidies in many cases.

# 5 Case studies

### Main e-learning actors in the Slovak Republic

The most significant e-learning projects in non-commercial sector were initiated and provided mainly by these institutions:

- Universities;
- State Institute of Information and Prognoses on Education;
- Non-Government organizations;
- Private sector.

In private sector there can be found the following companies being significant in providing trainings through e-learning:

- CISCO Slovakia s.r.o. – e-learning on ICT topics (certified courses);
- EL&T, s.r.o. – different kind of e-learning topics;
- ELFA s.r.o. – different kinds of e-learning topics;
- Novitech Partner a.s. – project TeleDom – different kinds of e-learning topics ( management, marketing, finance, project management);
- E-ducation.sk – new free-ducational network with the main aim to globalize and centralize educational content and studying people as well;
- SAP Slovensko s.r.o. – wide range of learning styles and subject-matter requirements.

The most active actors in training institutions using e-learning in the training of relevant target groups are as follows:

- CNAP (CISCO Networking Academy Program);
- Institute of LLL of Slovak Technical University in Bratislava,
- Academy of Education (Akademia vzdelavania);
- Slovak Society for Computer Science (civic association) – ECDL trainings coordinator and methodology centre in Slovakia.

The most active business companies using e-learning in the training of their own employees based on reports in the media are as follows:

- Slovnaft (oil company – MOL subsidiary company);
- Slovak Telekom and T-Mobile (Deutsche Telekom group);
- Orange Slovakia (Orange group – mobile operator);
- Matador Puchov (tyre manufacturer);
- ESET (Slovak private SW company – antivirus software producer well known worldwide);
- Banks (mainly with foreign capital) - e.g. Slovenska sporitelna (Erste Bank group);

- Alternative telecom operators, national and regional energy distribution companies (e.g. SPP – monopoly gas distributor).

Government plans to use e-learning as an important training method in trainings of unemployed people and physically disadvantaged people (by calls for Specific Structural Fund Operational Programs in the areas of Human Resources, Training, and Education). Usage of e-learning is limited by low digital literacy currently reachable by the mentioned target groups. e-learning courses for the unemployed and disadvantaged are managed by local Labour Offices located in each district.

### E-learning projects run by Slovak institution in present and past worth to mention

Every successful e-learning activity has a positive impact on society as it brings the possibility to test new ways of teaching and training. The overall impression which permeates from this analysis is that e-learning is perceived quite positively. However, although the vast majority finds that e-learning is supporting their qualification process, we are still missing common national strategy for involving ICT into educational process. This situation could be radically changed with new strategy of Ministry of Education Minerva 2.0 – Slovakia to the first league. The creation of a functional knowledge economy is a necessary precondition for a long-term increase of living standards and competitiveness of the economy in Slovakia. The main aims of this Strategy are:

- To increase participation of the Slovak Republic in the global knowledge economy;
- To support all forms of LLL relevant for the knowledge economy and thus improve the competitiveness of Slovak citizens on a global labour market;
- To remove barriers of e-commerce and e-business development;
- To improve public administration services by means of ICT.

### Research and evaluation

The following **positive features and trends** were observed in Slovakia in the area of

e-learning:

### In the Field of Education

- Blended learning is regularly used for many years;
- Since 1997 there has been CNAP (Cisco Networking Academy Program) implemented,
- INFOVEK activities (coordination, trainings for teachers and students) were developed;
- Implementation of specific e-learning pilot projects,
- Private initiatives like a Slovak Telekom project supported higher computer penetration at school facilities;
- Specific e-learning products (e-Economy) are available, several secondary school projects were implemented;
- multimedia technology and e-learning courses are regularly used in universities;
- SANET activities created technological infrastructure support for e-learning services,
- Several specific university e-learning projects were implemented (e.g. VUDU project);
- Financing from EU funds was available also for e-learning;
- Newer multimedia technology available at the majority of schools.

### In training at the Workplace

- Multimedia technology is regularly used;
- E-learning for trainings at the workplace are regularly implemented by big companies (Slovak Telekom, banks, etc.);
- Few domestic e-learning products on CDs, DVDs and Internet designed for training and education can be used in the training of specific target groups;
- CNAP (Cisco Networking Academy Program) trainings are available;
- E-learning started to be an important training method for civil servants, several

e-learning projects were implemented by central state administration institutions (eJustice, ECDL);

- Several e-learning projects organised by regional self-Government administrations were already implemented (e.g. a regional self-Government e-learning project for the region of Zilina, a specialised Virtual Academy project prepared by the regional self-Government for the region of Bratislava);
- Specific international cooperative e-learning projects (e.g. DILBAC – the banking sector in cooperation with universities);
- Multimedia technology is regularly used for teaching,

### In Life Long Learning

- The National Centre of DE was established in 1996;
- The national LLL strategy and LLL guidance were adopted by the Ministry of Education (in 2006 and 2007);
- Several universities have established lifelong training centres;
- Multimedia technology is regularly used at training centres;
- Government initiatives, such as the DIGISTUR Project, support development of ICT literacy by citizens;
- The structure of e-learning products on CDs and DVDs for education and training is well developed (mainly foreign products, e.g. Czech e-learning products on CDs and DVDs can be also used by at least 42% of Slovak citizens aged 15+);
- Few domestic e-learning products on CDs, DVDs and Internet designed for training and education can be used in the training of specific target groups (LLL at home);
- Several educational institutions started to provide e-learning courses, e.g.: City University Bratislava (business programs), Transfer Slovakia (management, marketing, engineering);
- Academia Istropolitana Nova (postgraduate studies in economics, architecture, environmental policy, European studies, English language), Akademia vzdela-

vania (language, professional and spare time courses), Verlag Dashofer (IT skills, practical economy courses);
- Few free of charge English training e-learning courses are available;
- The Government supports e-learning as an important method for the training of unemployed people and specifically disabled groups of people (SOP 2007-2013);
- Several NGO e-learning projects (e.g. School for Young Rescuers, DIVES project) were already implemented;
- Rapid foreign language skills development by youth creates a great potential for use of foreign e-learning products.

In Slovakia in the area of e-learning the following **negative features** were observed:

### In the Field of Education

- The information society framework is lagging behind the EU level (institutional, legal, financing matters);
- There is absence of the National e-learning Strategy, e-learning coordination at the national level, and database of existing e-learning products designed for education and training;
- Multimedia technology is not properly used in a large scale of schools;
- Inadequate financing of schools and HEIs causes the absence of modern/expensive latest e-learning systems at the majority of universities;
- Generally poor skills in e-learning content development at universities;
- Existing e-learning activities are very fragmented;
- ICT literacy at the general level is less developed than the EU25 average.

### In training at the Workplace

- Poor implementation of e-learning by SMEs.

### In Life Long Learning

- Insufficient legislation for LLL;
- An inadequate portfolio of domestic e-learning products designed for training and education on CDs, DVDs and Internet are available.

### Via ubiquitous learning (or u-learning) towards ubiquitous Internet society

Ubiquitous learning is defined as an equivalent to some form of simple mobile learning accessed in various contexts and situations. The ubiquitous learning environment (ULE) may detect more context data than e-learning. Besides the domains of e-learning, u-learning may use more context awareness to provide most adaptive contents for learners.[8)]

In a ubiquitous learning environment students can become totally immersed in the learning process. So this environment is a situation or setting of pervasive or omnipresent education.

The challenge in an information-rich world is not only to make information available to people at any time, at any place, and in any form, but specifically to say the right thing at the right time in the right way.

Characteristics of ubiquitous learning are mainly shown as follows:

- Permanency – learners can never lose their work unless it is purposefully deleted. In addition, all the learning processes are recorded continuously in everyday;
- Accessibility – learners have access to their documents, data, or videos from anywhere. That information is provided basically on their requests. Therefore, the learning involved is self-directed;
- Immediacy – wherever learners are, they can get any information immediately. Therefore learners can solve problems quickly. Otherwise, the learner may record the questions and look for the answer later;

8) Hye-jin, K., Caytiles, R.D., Tai-hoon, K. (2012).

- Interactivity – learners can interact with experts, teachers, or peers in the form of synchronies or asynchronous communication. Hence, the experts are more reachable and the knowledge is more available;
- Situating of instructional activities - the learning could be embedded in daily life. The problems encountered as well as the knowledge required are all presented in the nature and authentic forms. It helps learners notice the features of problem situations that make particular actions relevant;
- Adaptability – learners can get the right information at the right place with the right way.

Moreover, ubiquitous learning can be Computer Supported Collaborative Learning (CSCL) environments that focus on the socio-cognitive process of social knowledge building and sharing and also the term "ubiquitous learning environment" is derived from the term "ubiquitous computing", used to describe the moving of general computing off desktops and into many devices, to make computing available in all facets of everyday life.

A ubiquitous computing environment enables people learning at any time and any place. But the fundamental issue is how to provide learners right information at the right time in the right way. In this case we can agree with idea, that very often ubiquitous learning is characterized by providing intuitive ways for identifying right collaborators, right contents and right services in the right place at the right time based on learners surrounding. The effectiveness and efficiency of ubiquitous learning heavily relies on the surrounding context of learners.

### Slovakia → towards u-Slovakia?

Slovakia is a part of the eEurope Action Plan with the following objectives:

- Accelerating the putting in place of the basic building blocks for the Information Society;
- Providing a cheaper, faster securer Internet;
- Investing in people and skills;

- Stimulating the use of the Internet.

In comparison with other EU and OECD countries, Slovakia has seen only little systematic government involvement in support of the development of an information society framework over the last decade. The Ministry of Education has discussed the topic of e-learning within strategic documents, educational institutions at all levels of formal education have been connected to the Internet. However, ICT-based activities are not integrated in education at any level. The few courses making use of ICT at schools are typically results of the individual initiative of a teacher or an institution. In tertiary education, e-Learning is more widespread as several universities have developed ICT-enabled courses. Courses making use of ICT are also provided by several private training companies. Particularly, large IT companies and banks provide online training courses for their employees through their training systems at the workplace. Research on e-Learning is carried out by universities and by the State Institute of Information and Prognoses in Education.

One of successful Slovak projects called INFOVEK, the aim of which was to provide Internet access to 2,500 primary and 800 secondary schools by the end of 2005. In addition to the Internet connections, teachers are being trained to use ICT and integrate it into the teaching and learning process using multimedia materials and digital content. Also, the Slovak academic network (SANET) has been substantially improved, and the bandwidth of the backbone network has been upgraded (from 4Mbps to 1 Gbps). SANET still provides access to Internet for all universities, research institutions, scientific libraries and some schools and museums.

- E-Learning Helps Slovak Students Prepare for Eurozone Entry

More Than 9,000 Students Take Course Developed by Cisco, Technical University of Kosice and Slovenska Sporitelna

BRATISLAVA, Slovakia, December 1, 2008 - As Slovakia is getting ready for the

introduction of the euro on Jan. 1, 2009, secondary school students ages 14 to 19 can learn about the new national currency and the basics of banking and finance thanks to an e-learning course developed by the Slovak Republic's Ministry of Education in cooperation with Slovenska Sporitelna Bank and Cisco.

Students with their teacher and representatives of the Slovak Ministry of Education and Cisco at the 'EU and Euro 2009' award ceremony

The course, available at http://euro.netacad.sk, is the first online curriculum developed for secondary schools in Slovakia. The four learning modules, which can be completed in about two hours, are focused on the Eurozone and the European Union, the euro as a currency, the national implementation plan, and banking and financial terminology. Following the completion of the online training, students can take a quiz to test their newly acquired knowledge. So far, more than 9,000 students from 240 schools have completed the course.

"Our long-term cooperation with Slovenska Sporitelna and Cisco allows us to take an innovative approach to the learning process, and deliver new and quality content to secondary schools. This was key to the success of the online education course on EU and Euro 2009," said Ján Mikolaj, deputy prime minister and minister of education of the Slovak Republic.

The educational content was developed by the economics department of the Technical University of Kosice, with support from Slovenska Sporitelna Bank. The Slovak Cisco Networking Academy® community, including several local and regional academies, took charge of creating the e-learning framework.

"With the Cisco Networking Academy, which has been running in Slovakia since 1999, we have built a significant experience in delivering online education. So it was a natural next step to bring e-learning beyond the Networking Academy program and create a curriculum for all secondary schools in the country. This age group represents the Internet generation in Slovakia, and they were very enthusi-

astic about e-learning," said Frantisek Jakab, the Networking Academy area manager in Slovakia.

To further motivate students to take part in the programme, the Slovak Ministry of Education announced a competition for participating schools and classes. Out of the 240 schools that took part in the competition, the award for best school went to the Business School in Michalovce (eastern Slovakia), where 351 students took the course, representing 88 per cent of the student body. The best class award was given to the Business Academy in Senica (western Slovakia), whilst the central Slovakian region of Banska Bystrica was awarded for having the highest number of participating schools.

"When we started to develop the concept of the "EU and Euro" online education course, there was no educational material covering this topic. The high number of participating students highlights that the young generation is interested in fresh additions to their day-to-day curricula. We were pleased to see their interest in topics such as banking, finance and euro implementation and are glad that we could help develop such a great tool before our country joins the Eurozone in January 2009," said Regina Ovesny-Straka, general manager of Slovenska Sporitelna Bank.

## 6 Conclusion

At present, in Slovakia the main positive impact of e-learning on the education system can be seen only in tertiary education, which is characterised by the highest level of e-learning projects already implemented. A gradual positive impact can be observed also in training at workplace by big companies and in the LLL system provided

by universities. E-learning is gradually included in strategic Governmental documents (National Lisbon Strategy, education-related documents, etc.) as a significant and promising tool for the further development of education systems in Slovakia for all target groups.

Generally, available statistical data indicates that the supply of e-learning in Slovakia is currently not well developed. Potential demand seems to exist, although there is no statistical data available which could demonstrate its extent.

Currently, most interest seems to be in courses that are internationally certified. Universities, some private education institutions and large enterprises (mainly with foreign investments) are the most active in the development of e-learning services in Slovakia. Public administration, primary and secondary schools and SMEs are still lagging behind. However, universities fall behind in e-learning content management, since human resources in this area require heavy funding, which cannot be covered by grants and state subsidies in many cases.

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