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ANALYSING THE USABILITY OF ICT AND E-SERVICES FOR EDUCATIONAL PURPOSES AT THE SCHOOL OF KEMI RECEPTION CENTER

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Abstract of Thesis

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Education is the most important means that can be used to change and develop the world. Information and Communication Technology is one of the most innovative and progressive arena in today's world.

The objective of this study is to analyse teachers' and students' ability to use Information and Communication Technology and e-services to perform the required activities for teaching and learning purposes at the School of Kemi Reception Center. Exploratory research on literature and e-sources are performed to discover the accepted definitions and concepts of usability, ICT services, and pedagogical usability of ICT.

The research analyzes the effectiveness of ICT products and services used at the School of Kemi Reception Center. In-depth interviews, a questionnaire survey and conversations were conducted to collect quantitative and qualitative data. The SERVQUAL methodology was employed to analyse the collected quantitative data. The study comprises user satisfaction measurement and service quality gap analysis. This research produces a set of recommendations for the improvement of the effectiveness of the ICT services provided at the School of Kemi Reception Center.

The results of this study demonstrates that at the School of Kemi Reception Center the teachers use ICT and e-services effectively and efficiently to perform the required pedagogical activities. However, the students are not very effective at using ICT services to carry out the required learning activities. The survey indicates that the reasons for the students' low effectiveness are the limited opportunities to use ICT services, due to the fact that the School has not enough ICT products for the students. The limited ICT resources offered by the School to its students could be mitigated by the provisioning and equipping the classrooms with adequate ICT products and services in order to cover the pedagogical needs of the students attending the School of Kemi Reception Center.

Key words ICT and e-services, pedagogical, usability, effectively, efficiently, SERVQUAL

CONTENTS

1 INTRODUCTION

The background and motivation of the research are discussed first. Secondly, the objectives of the research are discussed. Finally, the structure of the thesis is presented.

1.1 Background and motivation

Information and Communication Technology (hereinafter ICT) plays an important role in the development of the world today. ICT is used in almost all areas of services and the ability at using ICT services to perform activities is highly required to enable easy and quick execution of processes. Various organizations and institutions are implementing ICT and e-services to increase their scope of activities, reach an increasing number of people and improve their performance.

Education is a key sector for the development of the societies and humanity. Mandela (2003, cited in voicesrising 2013), a winner of Nobel Prize, stated that “education is the most powerful weapon which you can use to change the world”. Meanwhile, to change the world positively it is relevant to develop and adopt adequate educational techniques and methods which meet the needs of the required change and development of the humanity.

The use of ICT and e-services for educational purposes enables fast development and expansion of the educational sector. Various educational institutions use ICT and e-services to enhance education quality, increase the scope of activities, and provide benefit to an increasing number of people (Ala-Mutka, Punie & Redecker 2008, 2).

The employment of ICT and e-services in the educational sector has assisted the improvement of the quality of teaching and learning activities. An ICT system adequately designed or adopted for specified educational purposes accel-

erates and facilitates educational institutions' work in reaching the planned goals (Lavonen, Krzywacki, Koistinen, Welzel-Breuer & Erb 2012, 142).

The motivation to conduct this research is the researcher's interest to analyse and comprehend how persons with little or no background on the Information Technology (hereinafter IT) arena perform when they start to use ICT services to carry out activities such as study or teach. Further the researcher is interested in discovering techniques and methods that can be used to facilitate teachers and students to develop competences to use ICT services effectively and efficiently to carry out teaching and learning activities. Another motivation for this study is to analyze and point out the advantages and benefits of the use of ICT and e-services for pedagogical purposes, in order to stimulate and boost the use of ICT services in the educational sector.

Kemi Reception Center (hereinafter KRC), i.e. Kemi Vastaanottokeskus in the Finnish language, is the case organization in this study. KRC is an institution administered by Finnish Red Cross, and it was founded in 2008 with the objective of receiving people who seek asylum in Finland, in order to give them shelter and assistance for inclusion in the Finnish society, while their case is being analysed and processed by the immigration office. KRC provides assistance to asylum seekers to facilitate adequate inclusion in the Finnish society. This assistance includes the means to learn the local language and basic knowledge or skills related to Finnish society, provided through the School of KRC.

The School of KRC utilizes ICT products and e-services, including computers and applications software, to assist teachers and students to perform the required pedagogical activities. Currently the School of KRC has approximately 200 students divided in 8 groups, attending the lessons in two classrooms. The classrooms are equipped with ICT devices and programs. The analysis of the ICT products available and the teachers' and students' ability to use ICT services to perform the required pedagogical activities at the School of KRC is relevant for this research.

This study was commissioned by the KRC, i.e. the administrators and teachers of the School of KRC to be precise. The Red Cross Reception Centers in Finland play an important role in sheltering and training the asylum seekers for their inclusion in the society. The administrators of the School of KRC and teachers are interested to gain knowledge regarding their ability and efficiency to assist persons studying at the School of KRC to acquire knowledge and skills which facilitates their inclusion in the Finnish society.

Education is suggested to be the best practice to instruct or train people to adequately adapt in a new society. Through this study, the administrators and teachers of the School of KRC expect to gain knowledge of their strengths and weaknesses, and where and how to improve, regarding the use of ICT and e-services to perform the required pedagogical activities at the School of KRC.

1.2 Objectives

The objective of this study is to analyse the ability of the teachers and students to use ICT and e-services effectively and efficiently to perform the required teaching and learning activities at the School of KRC. In order to assist the achievement of the objective of this research, the concepts of ICT and usability are explored, defined and described. Further, an analysis regarding the effectiveness of ICT products and e-services available at the School of KRC is conducted.

This work draws from literature and other sources for secondary data. Additionally, for collecting empirical data, interviews and discussions with the teachers, students, and administrators are conducted to find out the users' needs and satisfactions regarding the usability of ICT services. Further, a questionnaire survey was conducted among teachers and students. Analyses of all data are performed to discover and recommend techniques and methods to mitigate the gaps in the service quality provided, in order to meet users' expectations concerning the usability of ICT services at the School of KRC.

1.3 Thesis structure

This work is divided into seven chapters. The introduction chapter provides the background and motivation, the objective and the structure of the thesis. The second chapter presents the research scope, research questions, research methodology and the limitations of the research. The third chapter provides the definitions of the concepts of ICT and usability, and discusses the usability of ICT products. The fourth chapter discusses the pedagogical usability of ICT, the usability of ICT and e-services at educational institutions, and adequate use of ICT and e-services for educational purposes. The fifth chapter Presents the ICT and e-services available at the School of KRC, and makes a general observation of the service quality provided at the School of KRC. Further, the teachers' and students' ability to use ICT and e-services to perform the required pedagogical activities are discussed. Additionally, a summary of the analysis of the use of ICT and e-services for educational purposes at the School of KRC is provided. The sixth chapter is dedicated to putting forward suggestions and recommendations for the improvement of the users' ability to use ICT services effectively and efficiently to perform the required pedagogical activities at the School of KRC. Finally, chapter 7 concludes the study by summarizing the outcome of the research.

2 RESEARCH SCOPE, QUESTIONS AND METHODOLOGY

This chapter initially discusses the research scope. Secondly, the research questions are presented and explained. Thirdly, the research methodology is provided and described.

2.1 Research scope

This research explores the concepts of ICT services and usability, outlines adequate use of ICT and e-services for educational purposes. Further, the research analyzes the pedagogical usability of ICT and presents examples of educational institutions that use ICT and e-services effectively and efficiently for teaching and learning activities.

Specifically, this study analyses the effectiveness of ICT products and services, and the teachers' and students' ability to use ICT and e-services to perform the required teaching and learning activities at the School of KRC. Research on literature and e-sources is conducted to find techniques and methods which can be employed to assist teachers and students to develop or improve abilities to use ICT services effectively and efficiently for pedagogical activities at the School of KRC. Furthermore, this study discovers the gaps between users' expectations and perceptions regarding the effectiveness of ICT products and their ability to use ICT and e-services effectively and efficiently to perform the required pedagogical activities at the School of KRC.

2.2 Research questions

The research questions (hereinafter RQ) facilitate the achievement of the objectives of this study. There are three relevant RQ presented and explained, as follows:

RQ 1. What is the impact and effectiveness of ICT products and e-services available at the School of KRC?

This RQ aims to analyze the relevance and effectiveness of the ICT products and e-services, including hardware and software, available at the School of KRC. The quality and effectiveness of ICT equipment, products and e-services available at the School of KRC are analysed. Answering this question permits a comparison between ICT products used at the School of KRC, and the ones used at the educational institutions referred to in this study. The referred educational institutions use ICT and e-services effectively and efficiently for educational purposes.

RQ 2. How the effective and efficient use of ICT and e-services assist the teachers and students at the School of KRC perform pedagogical activities?

This RQ is asked to find out the teachers' and students' ability to use ICT and e-services to teach and learn at the School of KRC. Analyzing this question enables the researcher to identify and point out the strengths and weaknesses of the teachers and students regarding the ability to use ICT and e-services to perform the activities of teaching and learning at the School of KRC. The techniques, methods, software programs and technology used at the School of KRC are studied. The ability of the teachers and students to use ICT and e-services to carry out the required pedagogical activities at the School of KRC are analyzed. The conduction of in-depth interviews, discussions and a questionnaire survey enabled the researcher to collect data to analyze and answer this RQ.

RQ 3. What are the users' perceptions regarding the effectiveness of ICT products, and the teachers' and students' ability to use ICT and e-services to perform pedagogical activities at the School of KRC?

The aim of this RQ is to perceive the teachers' and students' levels of satisfaction regarding the effectiveness of ICT products, and the teachers' and students' ability to use ICT and e-services effectively and efficiently to perform teaching and learning activities at the School of KRC. The data collected through a questionnaire survey and the employment of SERVQUAL methodology permitted the researcher to analyze and answer this RQ.

2.3 Research methodology

This research combines theory and practice. Initially, research on literature and e-sources is performed to define and gain understanding of the concepts of ICT and usability. Further, exploratory and descriptive research on relevant literature is conducted to obtain broader understanding and application of the concepts of usability of ICT and pedagogical usability of ICT. The theoretical part of this research is performed through the use of secondary sources obtained from established sources, including literature and e-resources.

In the empirical part of this study, the usability of ICT and e-services for educational purposes at the School of KRC as a single case study is analysed based on quantitative and qualitative data. According to Yin (2009, 93) “a case study is an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context”. The primary sources for this study were collected through in-depth interviews, a questionnaire survey and discussions with the users of ICT and e-services at the School of KRC (Yin 2011, 4-6). The primary sources used for this study are described in the sections to follow.

Due to the requirement of this research the SERVQUAL methodology, developed by Parasuraman, Zeithaml and Berry (1985, 1988, 1991, 1994; Parasuraman, Zeithaml & Berry 1990) is used for three reasons. The first reason for the use is to analyse the quality and usability of the ICT products and e-services available at the School of KRC. Secondly, SERVQUAL enables to analyze the users’ ability to use ICT services to perform the required activities for educational purposes. Thirdly, using SERVQUAL it is possible to discover the levels of the users’ satisfactions regarding the effectiveness of ICT products, and the ability to use ICT and e-services effectively and efficiently to perform the required pedagogical activities at the School of KRC.

The SERVQUAL methodology is a widely accepted instrument to determine service quality. The SERVQUAL model defines five dimensions to conduct a gap analysis of an organization’s service quality, as follows:

- Reliability: the ability to perform the promised service consistently, accurately and within the time.
- Responsiveness: the ability to help customers with quick high quality services.
- Empathy: the individualized attention, care and consideration that employees give to customers.
- Assurance: the knowledge, skills and credibility of employees and their ability to convey trust and confidence.
- Tangibles: physical facilities of the service provided, such as; equipment, offices, personnel, and communication materials. (Shahin 2006, 4 citing van Iwaarden *et al*. 2003.)

The SERVQUAL methodology is adequate to discover and explore the users' levels of satisfaction regarding the usability of ICT and the ability to use ICT services effectively and efficiently at the School of KRC. The dimensions proposed by Parasuraman *et al.* (1991, 423) are applied to analyse the service quality delivered at the School of KRC.

According to the SERVQUAL methodology, each dimension is formed by paired questions. One question measures the expectations while the other one measures the perceptions of the users relative to the case in study. The results are compared and represented as SERVQUAL scores. The levels of users' satisfaction regarding the ability to use ICT services effectively and efficiently to perform the required pedagogical activities are estimated, and recommendations for the improvement of services delivered are made. (Shahin 2006, 4-5.)

The question for the questionnaire are designed in order to enable the researcher to analyse the teachers' and students' ability to use ICT services effectively and efficiently to perform the required pedagogical activities at the School of KRC in the five dimensions defined by the SERVQUAL methodology. The questionnaire survey is divided into seven sections and comprises 25 questions. The first section collects personal information of the users. The second to sixth sections is designed to collect information regarding the five dimensions

proposed by the SERVQUAL methodology to measure the service quality regarding the usability of ICT products and the teachers' and students' ability to use ICT services effectively and efficiently to perform the required pedagogical activities (Parasuraman *et al*. 1994, 116-117). The seventh section collects data concerning the teachers' and students' levels of satisfaction, regarding the effectiveness of ICT products, and the ability to use ICT services effectively and efficiently to carry out the required teaching and learning activities at the School of KRC.

A number of selected users were interviewed by the researcher who focused the questions on fundamental aspects of the five dimensions of the SERVQUAL methodology. These aspects can assist the teachers and students to improve their abilities to use ICT services effectively and efficiently to perform the required activities for teaching and learning purposes at the School of KRC. The interview techniques and methods assisted the researcher to explore the perceptions of the interviewees and collect important qualitative data concerning the case in study. The ways the questions are placed for each dimension are presented below:

Table 1. SERVQUAL dimensions matched to questions for the survey

Dimension	**Question order in the questions number 5 to 22**
Reliability	5 – 8
Responsiveness	9 – 12
Empathy	13 – 16
Assurance	17 – 18
Tangible	19 – 22

SERVQUAL methodology enables the analysis of different aspects of service quality delivered in an institution (Iwaarden *et al.* 2003 cited by Shahin 2006, 4). This research applies the five dimensions proposed by the SERVQUAL methodology to analyze the service quality delivered at the School of KRC for the following purposes:

- Reliability

The researcher uses this dimension to analyze the effectiveness of ICT products available, and the ability of teachers and students to use ICT and e-services effectively and efficiently to perform the required teaching and learning activities at the School of KRC. The effective use of ICT services can assist the teachers and students to accomplish effectively and efficiently the tasks designed by the School of KRC.

- Responsiveness

This dimension is used by the researcher to analyze the readiness of the administrators to support the teachers and students to have available adequate facilities and ICT products at the School of KRC. The access to adequate facilities and ICT products facilitates the users to use ICT and e-services effectively and efficiently to carry out pedagogical activities.

- Empathy

This dimension is used by the researcher to analyze the engagement of the administrators and teachers to assist students according to each student situation and needs. The analysis of this dimension permits the evaluation of the opportunities given to the students with special needs, such as pregnant and disabled persons, to use ICT services effectively and efficiently to perform the required learning activities designed by the School of KRC.

- Assurance

The researcher uses this dimension to analyze how teachers use their knowledge and ability regarding the use of ICT services to motivate students to develop abilities to use ICT services in order to perform learning activities at the School of KRC. Adequate attitudes of the teachers can stimulate students to

look arduously to develop abilities to use ICT services effectively and efficiently to perform designed learning activities.

- Tangible

This dimension is used by the researcher to analyze ICT equipment topology, the teachers' and students' behaviour in the classroom when performing pedagogical activities using ICT services, and the premises of the School of KRC. The logical architecture of ICT equipment, and adequate behaviour of the ICT services' users in an educational institution, facilitates the users to use ICT services effectively and efficiently to carry out the required pedagogical activities.

Interviews and questionnaire

The interviews for this research were designed and conducted in a way to permit open conversations in order to motivate the interviewees to express openly their views, expectations and perceptions. In total 6 interviews and 3 conversations were conducted for the research which involved the participation of 2 teachers and 4 students for the interviews, and 1 administrator and 2 staff members for the conversations. The transcripts of the interviews and questionnaire survey conducted anonymously for the research are included in the Appendices.

The questionnaire survey enabled the researcher to collect important quantitative and qualitative data regarding the users' satisfactions. The data collected permitted the measurement of the levels of the users' satisfaction regarding the effectiveness of ICT products and the ability to use ICT services effectively and efficiently to perform the required pedagogical activities at the School of KRC.

Two different forms were developed for the survey, one for the students and one for the teachers. The reason to use two forms is that on the teachers form the teachers assess the students' ability, and on the students form the students

assess the teachers' ability regarding the use of ICT services effectively and efficiently to perform the required pedagogical activities at the School of KRC.

The section of the questionnaire to measure the levels of users' satisfaction comprises three questions with the following purposes: the first question is for the respondent to assess his/her own ability regarding the use of ICT services effectively and efficiently to perform the required pedagogical activities. The second question is for the respondent to assess the teachers' or students' ability to use ICT services effectively and efficiently to carry out the required teaching and learning activities. Finally, the third question is for the respondent to assess the effectiveness of ICT products and services to assist teachers and students to effectively and efficiently perform the required pedagogical activities at the School of KRC.

The questionnaire, in paper form, was provided to the students and teachers at the premises of the School of KRC during the month of September 2015. The students participated enthusiastically in the survey, filling the forms during the breaks of the lessons. The teachers filled the questionnaire form as well as helped the researcher to distribute the forms and explain the aims of the questionnaire survey to the students.

2.4 Limitations

This research has two main limitations. Firstly, this research was performed in a School of a Reception Center. The major respondents of the survey are students, who are also asylum seekers. Consequently the number of the students can change considerably in a short period of time depending on the number of persons coming into or leaving the Reception Center. The sudden change of the students and the number of the users interfered with the planned execution of the survey. Secondly, most of the students communicate better and fluently in the languages that the researcher is not able to use to communicate in. These factors limited the researcher to interview or discuss to a considerable number of students whose opinion could enrich further this research.

3 USABILITY OF INFORMATION COMMUNICATION TECHNOLOGY

This chapter provides the accepted definitions and the general understanding for the concepts of ICT and usability. Further, the usability of ICT is discussed.

3.1 Information and Communication Technology

ICT is often associated with IT which is understood as the information applied to technologies, including computers, multimedia, videos, software applications, the internet or any electronic device, and the processes to create, process, store and exchanging electronic data (NATIONAL SCIENCE FOUNDATION 1996, 6). However, ICT is a more specific concept focusing in the communication aspect which enable people to use technologies to perform required activities such as distance learning, e-commerce, e-government, e.g. from any place. ICT integrates communications systems such as telecommunications lines, network system, computers, software or audio-visual systems, which enable the users to access, store, transmit, and manipulate information.

An accepted definition of ICT states that, “ICT is technology that supports activities involving information. Such activities include gathering, processing, storing and presenting data. Increasingly these activities also involve collaboration and communication” (Gokhe 2015, 1). Since ICT involves collaboration and communication various organizations and institutions are using ICT to get better performance in their activities.

The United Nations Educational, Scientific and Cultural Organization (UNESCO) define ICT as “the combination of informatics technology with other, related technologies, specifically communication technology” (UNESCO 2002, 13). Leading to an accepted understanding of the ICT as components of integrated arrangements of devices, tools, services, practices which enable information to be collected, processed, stored and shared.

However, there is not universal definition for ICT, due the fact that the concepts, methods and applications regarding ICT are constantly evolving. The concept of ICT covers any product which stores, retrieve, manipulate, transmit or receive information electronically in a digital form.

3.2 Usability

The international standard (hereinafter ISO) defines usability as “the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use” (Wöckl 2010, 2 citing ISO 1997). Usability is to make products and systems easier and satisfactory to use, matching them closer to users’ needs and requirements, allowing the users to utilize the products and systems effectively and efficiently to perform the required activities.

The usability of a product involves the satisfaction of five basic quality components which enable the user to utilize adequately the product in order to effectively and efficiently perform specified activities. The five basic quality components known as the five attributes of usability are as follows:

- Learnability: analyzes how easy the users can solve or accomplish tasks the first time they use the product to perform required activities.
- Efficiency: once the users know the product, how fast can they perform to solve or accomplish required tasks using the product?
- Memorability: analyzes how easy the users can remember to use efficiently a product, when the users restart to use the product after a period of not using it.
- Error: analyzes how many errors the users can make when using the product, the severity of these errors, and how easy the users can recover from these errors.
- Satisfaction: assesses how pleasant and satisfactory the product is for the users. (Nielsen 2012.)

However, there are various definitions of usability proposed by several authors. Despite the fact that those definitions differ on more detailed levels, they have some consensus on the concept of usability. The various proposed concept of usability can be summarized as the effective, efficient and satisfactory use of a product (van Welie & der Veer & Eliëns 1999, 615).

Table 2. Usability as in ISO 9241-11 & B. Shneiderman & J. Nielsen (adopted from van Welie & der Veer & Eliëns 1999)

ISO 9241-11	**Shneiderman**	**Nielsen**
Efficiency	Speed of performance Time to learn	Efficiency Learnability
Effectiveness	Retention over time Rate of errors by users	Memorability Error/Safety
Satisfaction	Subjective satisfaction	Satisfaction

Usability is also understood as the learnability and ease of use of a human-made object, the object can be computer, software application, website, book, digital library or any product that humans interact with (Preece, Rogers, Sharp, Benyon, Holland & Carey 1994, 14). Exploring the five attributes of usability the users can utilize a product or system effectively and efficiently to perform specified activities and accomplish task satisfactorily.

3.3 Usability of ICT

As discussed in the previous section usability is also understood as the learnability and ease use of a human-made object. In this study the human-made object are the ICT products and e-services.

Designing for usability of ICT products

In order to satisfy the basic aspects of usability an ICT product is suggested to be designed or adopted focusing on the potential users and tasks for the ICT product. Usability considerations such as who the users are and users' experi-

ence at using ICT products are helpful to develop or adopt ICT products and services usable for the specified potential users (Preece *et al.* 1994, 401).

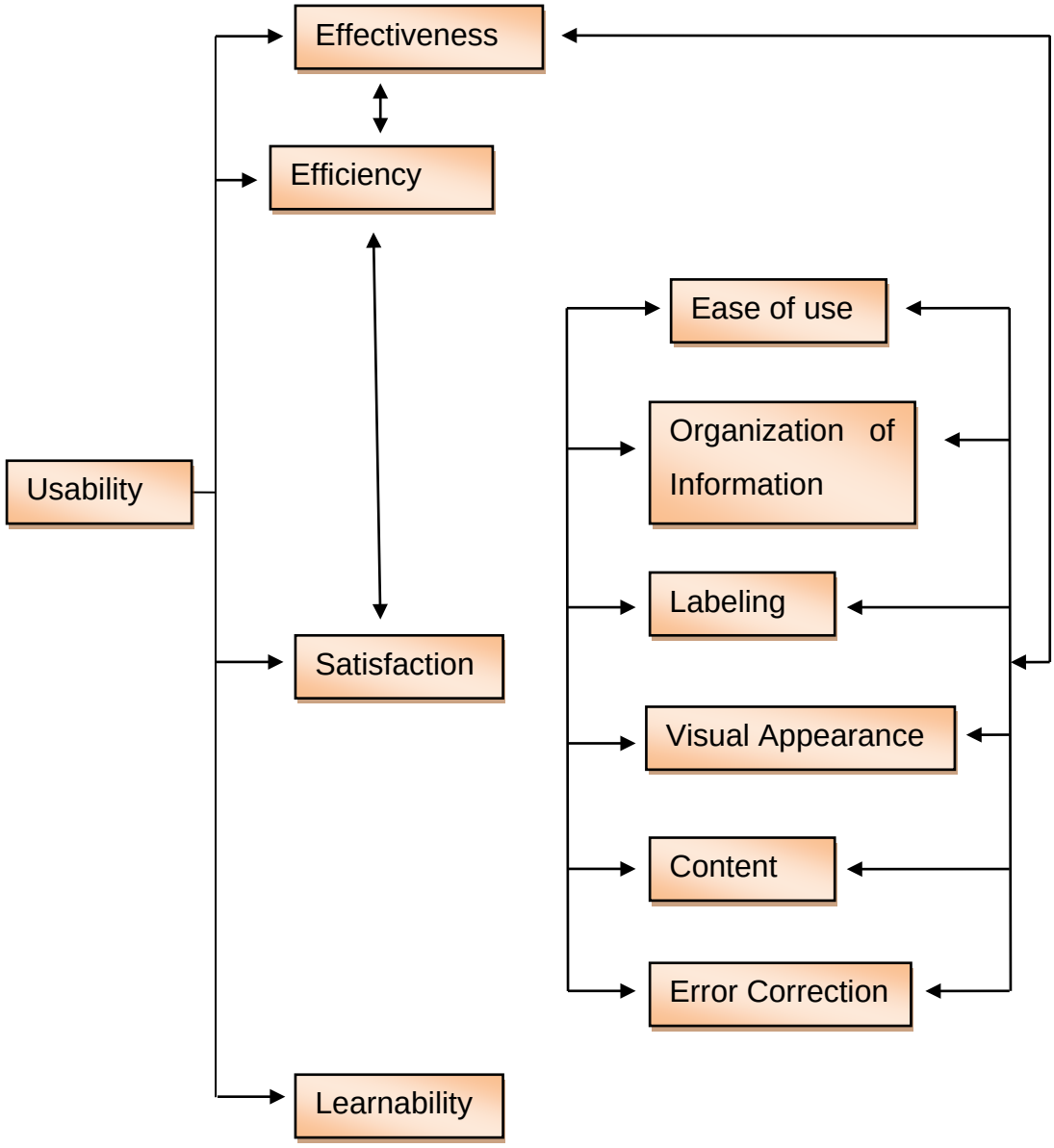

Figure 1. A Model of Usability Evaluation for Digital Library (adopted from Jeng 2005, 102)

ICT products should be adopted according to the needs of each educational institution. Adequate adoption of ICT products and services for an educational institution enables the effective use of the adopted ICT products. The effective-

ness of an ICT product facilitates the effective and efficient execution of the tasks assigned for the product (Jeng 2005, 101-102).

ICT products and e-services are used to facilitate the execution of activities, improve the outcomes of performed activities and streamline processes. Considering the basic attributes of usability, an ICT product is suggested to be adopted in order to meet the needs of the intended users according to each specified activity and purpose, in a way that the users can use the ICT product effectively and efficiently to perform the required activities.

In this study the concept of usability is applied to refer to the effectiveness of ICT products and services adopted to assist the users to execute specified activities in a specified context. The required activities for educational purposes are the focus of this research.

4 ICT AND E-SERVICES FOR EDUCATIONAL PURPOSES

This chapter discusses the meaning of pedagogical usability of ICT. Describes the usability of ICT and e-services at educational institutions, and analyzes adequate use of ICT and e-services for educational purposes.

4.1 Pedagogical usability of ICT

In today's world dominated by science and technology it's relevant the use of ICT services in the educational sector. The use of ICT services in order to enhance and accelerate educational processes are widely accepted and applied. "In general, there is broad agreement on the reasons why ICT application should be integrated into science education and the advantage of its use in teaching and learning science" (Lavonen *et al*. 2012, 139).

Usability of ICT as discussed previously (section 3.3) considers the ICT products and services designed or adopted in order to meet users' need for a specific activity so that the user can use effectively and efficiently the product to execute the required activities. Pedagogical usability of a system, depend on the goals designed for a teaching and learning context (Nokelainen 2006, 180 citing Nielsen 1990, 148). Pedagogical usability of ICT refers to adequate adoption of ICT products and services in order to enable the users to use the ICT products and services effectively, efficiently and satisfactorily for pedagogical purposes (Lavonen *et al*. 2012, 144).

Teachers are suggested to consider the fact that, if the students are not able to use an adopted ICT product effectively and efficiently, they can face high level of difficulties to perform the required pedagogical activities. Approaching usability of ICT for educational purposes Lavonen *et al.* (2012) suggests the development of course module from 4 different perspectives of usability, as follows:

- “Content related and technical usability
- Usability, especially in the case of multimedia
- Meaningful learning issues related to usability
- Motivation issues related to usability.” (Lavonen *et al*. 2012, 145.)

According to Lavonen *et al.* (2012, 141) “The aim of the course module designed in the project is to help science teachers to adopt ICT applications for educational purposes and to understand the dimensions of usability from the science education point of view”. Educational institutions and teachers are suggested to develop or adopt ICT products which are suitable for the characteristics of the course delivered and the needs of the users.

Table 3. The objectives of the course module, focusing on usability of ICT applications in science education (adopted from Lavonen *et al*. 2012, 146)

A teacher is able to choose ICT applications for science education and take the technical and pedagogical usability of the application into account.			
Content related and technical usability	Usability of multimedia	Meaningful learning issues related to usability	Motivational usability
A learner is familiar with and is able to take science content related and technical issues into account in selecting an ICT application for a learning activity.	A learner is familiar with and is able to take issues related to usability of multimedia into account in selecting an ICT application for a learning activity.	A learner is familiar with and is able to take learning related issues into account in selecting an ICT application for a learning activity.	A learner is familiar with and is able to take motivational issues into account in selecting an ICT application for a learning activity.

When adopting ICT products for educational programs, educational institutions and teachers are suggested to contemplate the aspects of pedagogical usability of ICT. Further, the teachers should find out and use adequate techniques and methods to motivate and assist the students to understand an ICT product adopted for an educational program. Adequate use of ICT products, enable students to use ICT services effectively and efficiently to perform the required learning activities designed for a course (Heafner 2004, 44).

4.2 Usability of ICT and e-services at educational institutions

This section presents the technologies, techniques and methods employed to enable users to use ICT and e-services effectively and efficiently to perform pedagogical activities at educational institutions. Further, is presented examples of educational institutions that use ICT and e-services effectively and efficiently for teaching and learning activities.

Adequate ICT services

According to Lavonen *et al*. (2012, 140) “ICT is treated as a set of available software enabling students and teachers to accomplish their tasks more efficiently.” The use of adequate ICT products and services facilitates the teachers and students to execute with effectiveness the pedagogical activities designed by an educational institution. Educational institutions should adopt ICT products and services which comply with the usability requirements of ICT products.

In order to adopt adequate ICT services, the educational institutions are suggested to focus on the adoption of ICT products and services whose features are suitable to the specific needs of the educational institution and users. The adoption of ICT products which meets the needs of the educational institutions enables the teachers to use ICT and e-services effectively and efficiently to perform pedagogical activities. The effective and efficient use of ICT services permits an effective delivery of the educational programs.

Teachers

According to Nielsen (1993, cited by Lavonen *et al*. 2012, 142) “utility is the number of features needed to reach required goals and usability is the ability of the user to utilize these features”. The use of adequate ICT and e-services for a specified educational program or course permits the teachers to explore broader, and use the ICT services in various manners, enabling the teachers to discover adequate ways to deliver the lessons in order to meet students’ needs in a specified context.

The teachers are suggested to explore ICT services developed or adopted for a specific educational programme to acquire enough understanding and control on the use of the ICT product. “While planning a teaching situation, a teacher makes several decisions considering teaching approaches, learning material and how to use ICT applications” (Lavonen *et al*. 2012).

Moodle

Modular Object-Oriented Dynamic Learning Environment (hereinafter Moodle), is a software learning management system, developed on pedagogical principles. Moodle is a learning platform which provides to the users a single, secure and integrated system to create personalised learning environments (Castro 2004, 3-4).

Moodle is an effective ICT application used in various educational institutions enabling the teachers to perform pedagogical activities. The activities performed through Moodle include, deliver material to students, give instructions, access performed task or activities, and give feedback. Moodle allows communication between users registered and attending the same course or programme.

Moodle can be used for primary, adult or university education and in all areas of knowledge. Moodle allows the teachers to perform teaching activities of a course using e-services over the internet. Moodle facilitates students’ participa-

tion and involvement to the course through the internet, enabling the students to access course contents at any time or place. (Ros 2008, 6.)

Moodle allows the students to perform faster the required learning activities, and enable teachers to access quickly and satisfactorily the activities executed by the students (de la Torre 2006, 2-4). The adoption of Moodle environment to deliver contents for specified courses or educational programs is relevant to achieve pedagogical goals through e-services.

iLinc

iLinc is an e-service communication tool which provides Web conferencing software and audio conferencing for online activities such as meetings, presentations or lectures. iLinc technology and techniques enables users in different locations, independently of distance, to communicate and collaborate online.

When adequately utilized, iLinc is an excellent tool to reach and educate people simultaneously at any place, providing that there is available internet access point and adequate ICT products and services to follow a designed educational programme or instruction. iLinc is a tool which can be used to help students with special needs, or even persons with occupations or situations which do not permit them to be at the School premises regularly, but they like to attend a specified educational programme.

Using iLinc teachers can conduct online training session, conference with a student, host a meeting or deliver lectures to an entire class with dozens of students. iLinc conferencing application provides to the teachers as well as to students the possibility to share screen of the computers for conferencing in real time.

During iLinc sessions students or participants can raise their hand to give answers, comments or chat with the host. The participants can share files and make annotation on the screen. When a student wants to have center stage,

the teacher can grant the stage by handing off controls. The participants with profile picture when having control their picture appears on the top left of the screen, drawing the attention of the audience to the user in control (Wilson 2012, 16).

Various educational institutions require and instruct their teachers, students and in some cases staff members to use applications such as Moodle and iLinc. Adequate use of Moodle and iLinc can assist the teachers and students to effectively and efficiently perform the required pedagogical activities designed by the educational institutions.

When an educational institution uses adequate ICT products and services, it enables the users to use ICT and e-services effectively and efficiently to perform the required teaching and learning activities. The pedagogical processes of the educational institution are accelerated, the scope of activities is increased, the tasks are accomplished faster and easier and the results are improved, as the following examples demonstrate:

- Lapland University of Applied Sciences

Lapland University of Applied Sciences (hereinafter Lapland UAS) is an educational institution which administers courses for Bachelor and Master Degrees. Lapland UAS utilizes a Moodle environment system, which enables the teachers and students to perform the required activities of teaching and learning designed by the university.

Using Moodle environment, the teachers at Lapland UAS provide to the students orientations and study material such as course outline, course contents including videos, and assignments. Through Moodle environment the students access contents and relevant information of the courses, enabling them to carry out learning activities. Further, the Moodle environment permits the teachers to receive performed assignments or works, give feedbacks, comments and advices (Ivanics 2015, 44).

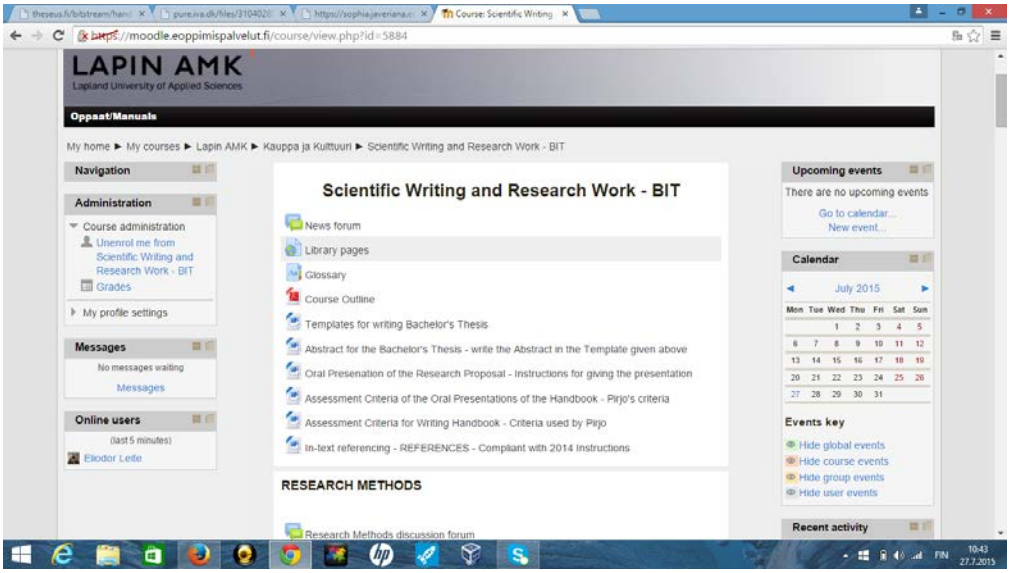

Figure 2. Moodle environment interface of Lapland UAS where users can perform activities including teaching and learning

The teachers at Lapland UAS use also iLinc to administer courses or training sessions online at real time. The Lapland UAS uses the iLinc services to provide courses completely online, known as iLinc Courses at Lapland UAS, which permits teachers and students to be at any place suitable for them when lecturing or attending the iLinc courses also called Virtual Campus (Bacsich, Bastiaens & Bristow 2009, 16).

At Lapland UAS, the teachers provide also courses where the students can be present at the university premises or online at the same time. This practice allows the students who are not able to be at the university premises at a specific time, to attend and participate to the lessons via iLinc through the Internet from elsewhere suitable for the student. In this practice the classroom is composed of the students present in the classroom of the university and online students from elsewhere.

Using adequate ICT equipment and programs the professors and lectures at Lapland UAS are able to teach effectively and efficiently both groups. In other words, the students present at the university premises and online or virtually present students can all chat if they like to do so in real time. Further, the les-

sons provided via the iLinc tool are recorded and the participants can re-view the lessons at a time suitable for them.

Moodle environment and iLinc tool are used effectively and efficiently to perform pedagogical activities at Lapland UAS. The researcher of this study has experienced the effective and efficient use of Moodle environment and iLinc as a Bachelor Degree student at Lapland UAS.

There are various ways in which the teachers at Lapland UAS acquire ability to use and to instruct the students to use ICT and e-services effectively and efficiently to perform the required pedagogical activities. Many of the lecturers of Lapland UAS are qualified in the IT arena, which enables them to have enough knowledge and abilities to use ICT and e-services effectively and efficiently. The lecturers who are not expertise at using ICT and e-services are instructed in order to acquire enough ability to use ICT services effectively and efficiently to perform the required pedagogical activities according to the needs of each course.

Further, if the university starts using a new ICT product, technology or a feature is updated, the teachers are instructed to use it by an expert, enabling the teachers to instruct the students to use it as well. The Lapland UAS has specific departments, i.e. IT Service Desk and eLearning Service Center, composed of specialized staff and experts that provide assistance to the teachers and students, when required. Assistance is provided in how to use ICT and e-services effectively and efficiently to perform the pedagogical activities designed by the university (Ivanics 2015, 42).

- Livemocha

Livemocha is an educational community that uses e-services to provide online education, specifically languages courses. Livemocha offers a language exchange model where learners can be linked with instructors or native speakers of the chosen language via Web 2.0 technologies (Liaw 2011, 36).

Through e-services Livemocha provides instructional materials in the language which the student has chosen, as well as platform for learners and instructors to interact and assist each other to learn selected languages. Livemocha utilizes an interface design which enables users, after creating an account, to choose a language to learn and access the library where learners can find the material of the chosen course. The lessons of each course are organized in ascending numerical order.

The environment has a feature which allows the learners to follow the courses by reading the lessons' contents in text forms and listening. Other feature permits learner to read a text in loud voice and record it, the learner can assess him/herself by playing the recorded text, or send the record to an instructor who gives feedback. The feature also allows instructors to evaluate and give feedback to written texts sent by the learners. The feature enables learners to review lessons and re-do tasks (Jee & Park 2009, 450-451).

Livemocha provides a meaningful learning environment which enables people all over the world to get together to learn different languages through e-services (Liaw 2011, 39). After the conclusion of a course the learners may request the Livemocha certificate for the course concluded, and the Livemocha sends the requested certificate via e-services.

Livemocha uses adequate ICT products to deliver languages courses online. ICT services used by Livemocha enable the users to learn new languages, independently of the physical location and time, providing that the learners have adequate ICT equipments and internet access. The writer of this research learnt a new language via Livemocha online course.

The use of adequate ICT products enables the teachers and students at the educational institutions to use ICT and e-services effectively and efficiently to perform the required pedagogical activities. The effective and efficient execution of pedagogical activities enhances and accelerates the accomplishment of designed educational goals.

4.3 Adequate use of ICT and e-services for educational purposes

This section outlines adequate use of ICT and e-services for educational purposes. The effective use of ICT services contributes to the timely provision of required information, assisting educational systems to achieve designed goals (infoDEV 2010, 7).

As discussed before (section 4.1) pedagogical usability of ICT is understood as adequate use of ICT to perform teaching and learning activities. Adequate use of ICT and e-services for educational purposes implies adequate adoption of ICT products and services for a specific pedagogical activity and in a specified context, in order that the ICT product adopted satisfy the basics usability requirements for the specified context.

Persons are different in attitude and skills, having different needs (Nielsen 2002, 344). At educational institutions, the students are different, having different needs, motivation and goals. Educational institution and teachers are suggested to select and use the ICT products and e-services which are suitable for each specified group of students and for specified contexts (Chigona, Chigona & Davids 2014, 2).

Experience

The ability to use ICT services effectively and efficiently to perform activities may depend on the background of the users. The students with no previous experience at using ICT services to perform activities probably require more attention to start to use ICT services to perform activities than the students with previous experience. The teachers are suggested to use techniques and methods which are suitable for each student or group of students, in order to help the students to develop abilities to use ICT services to perform activities according to each student’s experience.

Motivation

Typically at educational institutions students have different motivations and objectives to learn a course or subject. The students motivated to use ICT services to perform the required learning activities discover faster the usefulness of ICT products to assist them to solve tasks. The motivated students satisfactorily target learning objectives with the use of ICT services in focus.

On the other hand, the students with little motivation to use ICT services to learn require that the educators use methods to draw their attention to the usefulness of ICT services. The teachers are suggested to use techniques and methods which draw the students' attention to the usefulness of ICT products to assist them to effectively and efficiently perform the required learning activities, and solve the tasks easier and faster.

Special needs and location

Students with special needs require that the educational institutions and educators use technology and methods adequate to their needs. For example, students suffering of myopia or eye problem require the use of ICT equipment and e-contents adequate to their visual needs. The teachers are suggested to utilize teaching techniques and methods which allow these students to be in a recommendable distance from where the ICT equipment or screen is located.

For various reasons a number of students may not be able to be present at a School premises in a specific time when a course or training session is being conducted. Using adequate online services the educational institutions can enable the students to attend and participate to the lessons from any place or location suitable for the students (section 4.2).

Educational institutions, teachers and students

The educational institutions are suggested to create means, such as IT services department, to assist teachers and students to acquire enough abilities to use ICT and e-services effectively and efficiently to perform the required pedagogical activities. The effectiveness of the users at using ICT services enables the accomplishment of the tasks on time designed by the educational institutions. Further, the educational institutions should acquire adequate ICT products, including computers and software applications. The teachers and students are suggested to engage themselves to acquire as much as they can knowledge and abilities regarding the use of ICT and e-services to perform the required teaching and learning activities.

Summary

Adequate adoption of ICT products to assist specified users, to use ICT and e-services to perform specified activities, in a specified context, enables the teachers and students to accomplish effectively the tasks designed by the educational institutions. The effective accomplishment of educational tasks boosts the pedagogical performance of the educational institutions. The next chapter analyzes the pedagogical use of ICT and e-services at the School of KRC.

5 ANALYSIS OF THE USE OF ICT AND E-SERVICES FOR EDUCATIONAL PURPOSES AT THE SCHOOL OF KRC

This chapter presents first ICT and e-services available at the School of KRC. Secondly a general observation of the service quality delivered at the School of KRC is described. Further, the teachers' and students' ability to use ICT services to perform the required pedagogical activities are analysed. Finally, a summary of the analysis of the use of ICT and e-services for educational purposes at the School of KRC is provided.

5.1 ICT and e-services available at the School of KRC

The School of KRC is part of the educational sector of KRC which provides basic education and orientation to enable asylum seekers to integrate in the new society. The premises and equipment for the School of KRC depends on KRC budget and plans. The administration of KRC provides assistance and support for the effective functionality of the School of KRC, including provision for the acquisition of ICT products and services, and qualified staff.

Hardware and software

Currently the School of KRC has two classrooms. Each classroom is equipped with radio player used to deliver recorded contents mostly from the book Suomen mestari, speakers, computers, printers, document camera, projector and a wall board. The wall board is mostly used to project the contents of the lessons or pedagogical videos.

The teachers use ICT and e-services which facilitate them to deliver the lessons at the School of KRC. The e-services enable the teachers to access pedagogical programs, including Koti Suomessa and Arjen aakkoset, via the internet. Sometimes the teachers use Google translator or dictionary online to help the students to know the meaning of a certain word at the students' own language.

The students can follow the lessons' contents which are projected on the board for the purpose.

Two of the teachers use the application Ekapeli Alku to assist the students to learn and pronounce the letters of Finnish alphabet. Ekapeli Alku is a pedagogical game application where the users by pressing specific buttons move a snake to a desired letter, and then the snake eats that letter and pronounces its name. This application gives the students an amusing way to learn and pronounce the letters of the Finnish alphabet.

5.2 General observations of services delivered at the School of KRC

This section presents the users' expectations and perceptions regarding the usability of ICT and e-services at the School of KRC. The general outcomes of the survey are discussed in this section.

The employment of the SERVQUAL methodology to analyse the questionnaire survey enabled the researcher to discover the gaps in the service quality provided at the School of KRC. The effectiveness of ICT products and services, and the users' ability to use ICT and e-services effectively and efficiently to perform the required pedagogical activities at the School of KRC were on focus of the analysis. Figure 3 evidences the service quality gaps for the questions 5 – 22 as revealed from the survey.

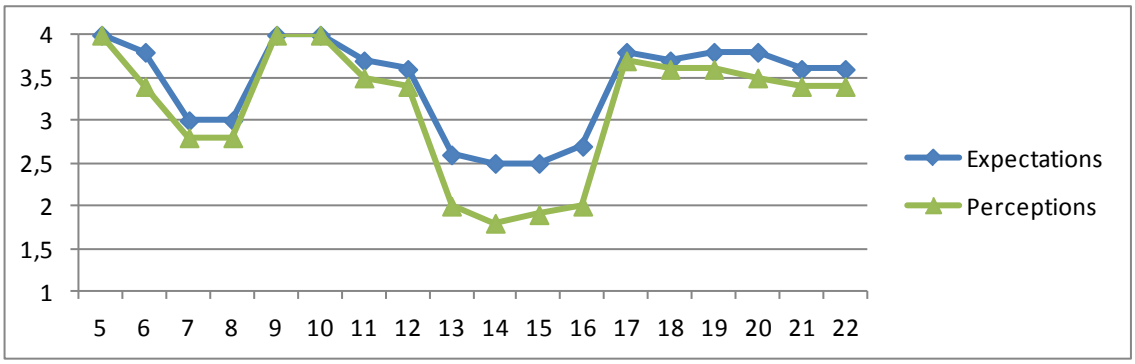

Figure 3. Expectations' and perceptions' gaps regarding the usability of ICT services at the School of KRC

The results of the survey as demonstrated in figure 3 indicate that on the dimensions of reliability, responsiveness, assurance, and tangible the gaps between expectation and perceptions are small. However, regarding the dimension of empathy, there is a considerable gap between expectations and perceptions of the users. The considerable gap at this dimension can be due to the fact that the School has no condition to satisfy the needs of students with special needs to use ICT services effectively and efficiently to perform the required learning activities designed by the School of KRC.

The outcomes of the survey shows a small gap at the majority of dimensions, indicating that the teachers' ability to use ICT and e-services to perform the required pedagogical activities at the School of KRC is close to meet the expectations of the students of the School. On the other hand the considerable gap at empathy dimension indicates that ICT products available at the School of KRC do not satisfy the students' needs and general users' expectations. Table 4 provides the outcomes of SERVQUAL analysis of the service quality regarding the use of ICT and e-services to perform the required pedagogical activities at the School of KRC.

Table 4. SERVQUAL score for the usability of ICT services quality gap analysis

Dimensions	**Expectations**	**Perceptions**	**Gap scores**	**Weightings**	**Weighted Average**
Reliability	3,45	3,25	-0,20	0,25	-0,05
Responsiveness	3,83	3,73	-0,10	0,25	-0,03
Empathy	2,58	1,93	-0,65	0,20	-0,13
Assurance	3,75	3,65	-0,10	0,20	-0,02
Tangible	3,70	3,48	-0,22	0,10	-0,02

Overall SERVQUAL score: -0.25

As shown in table 4 above, the small gap score of -0.2 at the questions 5 – 8 indicates that at the reliability dimension the administration of the School of KRC provide satisfactory assistance regarding ICT products and services for educational purposes. The assistance provided permits the teachers to use ICT

and e-services effectively and efficiently to perform the required pedagogical activities at the School of KRC.

The small gap score of -0.1 at the questions 9 – 12 indicates that at the responsiveness dimension, the administrators of the School of KRC provide to the teachers prompt assistance in accordance with their capability. The prompt assistance allows the teachers to have adequate premises and ICT services to perform the required pedagogical activities. Further, the prompt assistance provided by the administrators, enables the teachers to also promptly, assist the students when they need assistance regarding the use of ICT services to perform the required learning activities.

The considerable gap score of -0.65 at the questions 13 – 16 indicates that at the empathy dimension the School of KRC does not provide special conditions for the students with special needs, such as pregnant or disabled persons. The administrators of the School of KRC do not pay enough attention to specific needs of the students in general. The teachers do not require the students with special needs to be constantly at the School premises to use ICT services to carry out the learning activities. Also the teachers do not adopt or develop techniques and methods to enable the students with special needs to use ICT services effectively and efficiently to perform the required learning activities.

The small gap score of -0.1 at the questions 17 – 18 indicates that at the assurance dimension the teachers' willingness and ability to use ICT services to teach assist and motivate the students to explore their abilities to use ICT services to carry out learning activities. Further, the techniques and methods employed by the teachers when they use ICT services to deliver the lessons, assist the students to improve their abilities to use ICT services effectively and efficiently to perform the required learning activities at the School of KRC.

The small gap score of -0.22 at the questions 19 – 22 indicates that at the tangible dimension the School premises, ICT equipment and software are almost adequate for the required teaching and learning activities. However, in the

classroom along with the teachers some students do not explore effectively their abilities to use ICT services to perform the required learning activities.

The overall weighted SERVQUAL score of -0.25 recorded, a small gap, indicates that the service quality provided at the School of KRC, concerning the effectiveness of ICT products, and the users' ability to use ICT and e-services effectively and efficiently to perform the required pedagogical activities, is close to meet the users' expectations. However to meet effectively the users' expectations is necessary to improve the quality of services in the aspects of the dimensions that require attention for the effective use of ICT services at the School of KRC.

5.3 Teachers' ability to use ICT services to perform activities

This section analyzes the teachers' expectations and perceptions regarding the effectiveness of ICT products and the users' ability to use ICT and e-services effectively and efficiently to perform the required pedagogical activities. The effectiveness of the teachers at using ICT products facilitates the effective and efficient use of ICT and e-services at the School of KRC.

The teachers are the most experienced users of ICT and e-services in order to carry out pedagogical activities at the School of KRC. Due their experience and ability at using ICT services, the teachers play an important role to assist the students to be able to use ICT services effectively and efficiently to perform the required learning activities at the School of KRC (Copriady 2014, 117).

Often the teachers use ICT services to deliver lessons, the number of times that the teachers use an ICT mechanism or method to deliver pedagogical contents to the students may depend on the need of each lesson or even student. For example, if in a lesson, to comprehend the contents, the students need to listen various times the lesson content played from the radio player, the teacher replays this part of the lesson as many times as necessary according to students or lessons need. The number of times that the teachers use a feature of a se-

lected application or e-program to deliver contents during a lesson or course depends also on the needs of the students according to their perception regarding the content delivered.

The survey conducted, permitted to discover the teachers' levels of satisfaction, regarding the effectiveness of ICT products, and users' ability to use ICT and e-services effectively and efficiently to perform the required pedagogical activities at the School of KRC. The survey conducted with the teachers provided the following results:

Teachers' average satisfaction regarding the effectiveness of ICT products and users' ability to use ICT services at the School of KRC.

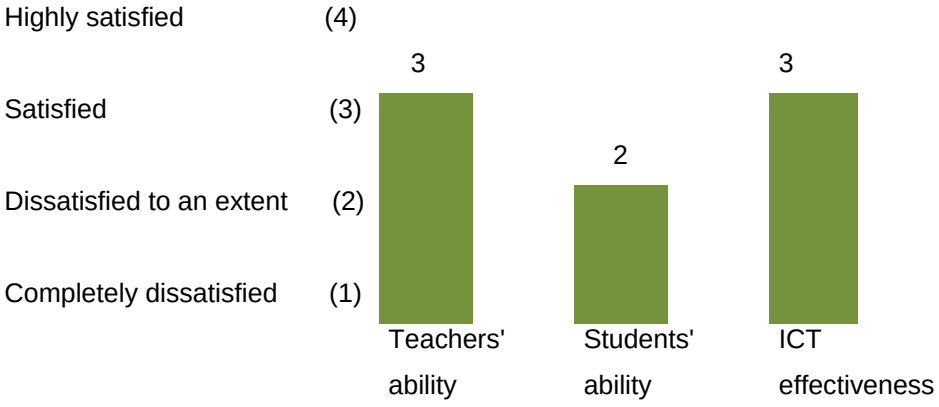

Figure 4. Teachers' satisfaction levels

Figure 4, demonstrates that the teachers are satisfied with their ability to use ICT and e-services to perform the required pedagogical activities. Further, the teachers are also satisfied with the effectiveness of ICT products and services to assist users to effectively and efficiently perform the required pedagogical activities. However, according to the teachers' experience, the students need improvement to use ICT services effectively and efficiently to perform the required learning activities at the School of KRC.

5.4 Students' ability to use ICT services to perform activities

This section, analyzes the students' expectations and perceptions regarding the effectiveness of ICT products, and the teachers' and students' ability to use ICT and e-services to carry out the required teaching and learning activities. The effectiveness of ICT products, assist the students to use ICT and e-services effectively and efficiently to perform the required learning activities at the School of KRC.

The students of the School of KRC are the majority of the respondents of this survey, i.e. a total of 77 students responded to the survey. Table 5 presents the distribution of the students' answers regarding the satisfaction levels concerning the effectiveness of ICT products, and the teachers' and students' ability to use ICT and e-services effectively and efficiently to perform the required pedagogical activities at the School of KRC.

Table 5. The observed students' distribution answers

	Completely dissatisfied	Dissatisfied to an extent	Satisfied	Highly satisfied	Overall answers
Students' ability	3	13	23	38	77
Teachers' ability	2	4	24	47	77
ICT effectiveness	2	5	34	36	77

Data are recorded elements resulting from observation or experiment (Yin 2011, 130). The data organized adequately facilitates the timely access to required information. The required information timely accessed helps to study a case. Accurate analysis of a case allows the discovery of the problem. When the problems of a case are discovered enables the search for solutions. The observed students' answers presented in table 5 helped the researcher to search for adequate answers for the case in study.

The levels of students' satisfaction regarding the effectiveness of ICT products, and the users' ability to use ICT services effectively and efficiently to perform the required pedagogical activities at the School of KRC can be perceived by the information in the figures to follow. Figure 5 below illustrates an explicit reference to the figures regarding the students' satisfactions to follow in the text.

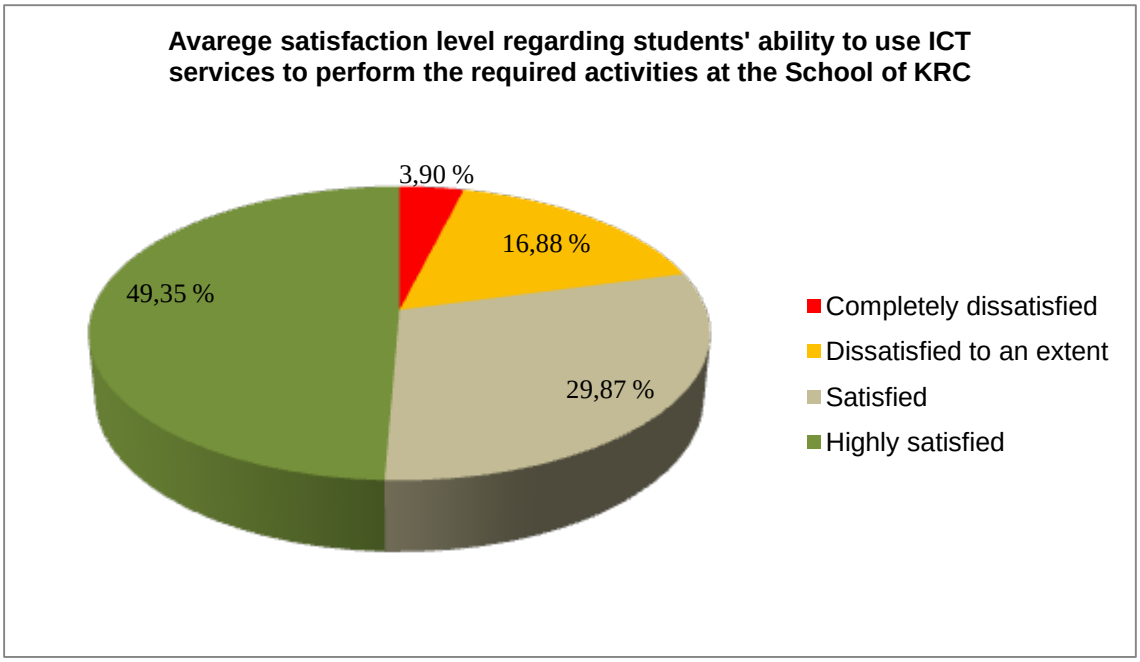

Figure 5. Students' satisfaction levels regarding the ability to use ICT services

Figure 5, indicates that many students are satisfied with their ability to use ICT services to perform the required learning activities at the School of KRC. However a considerable number of students are not satisfied with their competencies at using ICT services to perform learning activities. The students, who are not satisfied with their ability to use ICT services to carry out learning activities, require attention from the teachers to develop adequate competencies to use ICT services effectively and efficiently to perform the required learning activities.

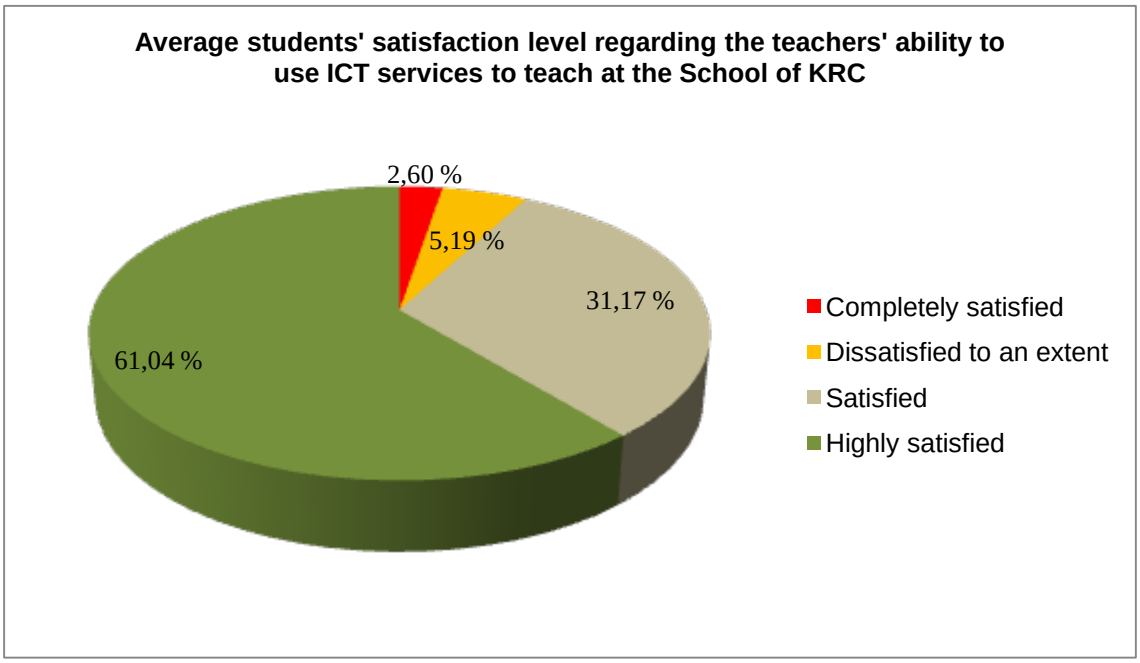

Figure 6. Students' satisfaction levels regarding the teachers' ability to use ICT services

Figure 6, demonstrates that most of the students at the School of KRC are satisfied with the teachers' ability to use ICT and e-services to teach. The satisfaction of the students indicates that the teachers are effective and efficient at using ICT and e-services to carry out the required pedagogical activities at the School of KRC.

Effective use of ICT products helps the teaching and learning activities in educational institutions (Lavonen *et al*. 2012, 139). The ability of the teachers to use ICT and e-services effectively and efficiently facilitates the execution of teaching and learning activities and streamlines the educational processes at the School of KRC.

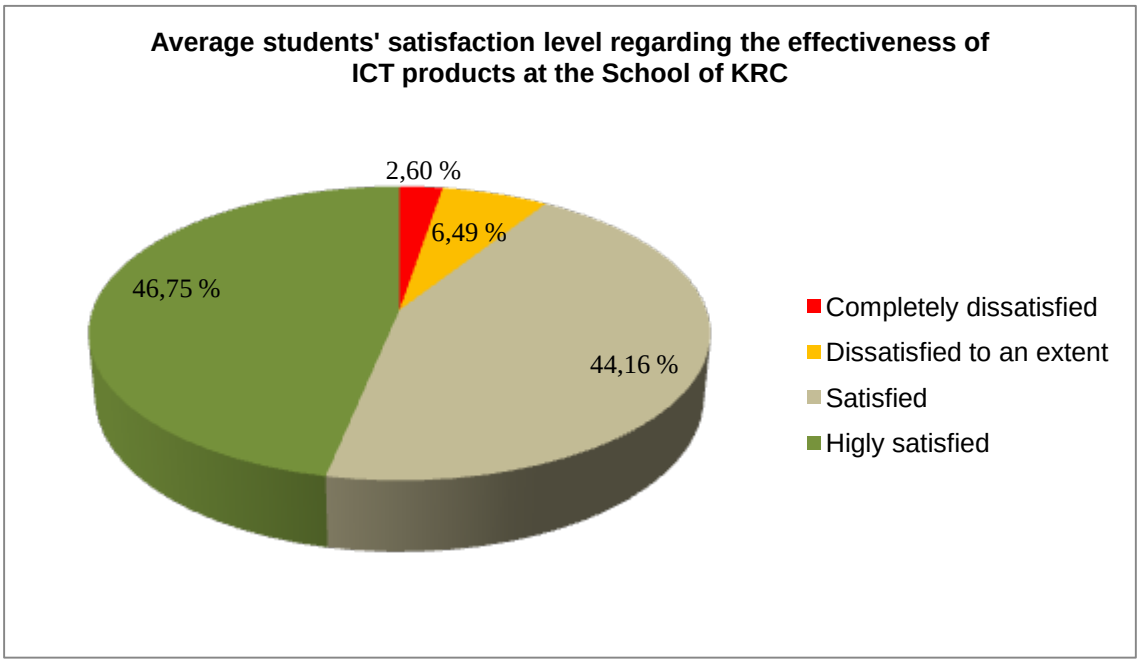

Figure 7. Students' satisfaction levels regarding the effectiveness of ICT products and services

Figure 7, demonstrates that the majority of the students are satisfied with the effectiveness of ICT products to assist the users to perform effectively and efficiently the required pedagogical activities at the School of KRC. However, the survey indicates that the users require high numbers of ICT equipment, including computers, to provide the students possibility to use regularly ICT services to carry out learning activities. The frequent use of ICT services facilitates the improvement of the users' ability at using ICT and e-services to perform the required learning activities.

5.5 Summary

Analysing the outcome of the survey enables the researcher to identify gaps in the service delivered at the School of KRC. The identification of the gaps permits the elaboration of a set of recommendations for the improvement of the service quality delivered in the aspects of the dimensions that require attention.

The results of the survey and interviews indicate that the teachers are satisfied with their own ability to use ICT and e-services effectively and efficiently to per-

form the required pedagogical activities, on the one hand. On the other hand, the teachers are not very satisfied with the students' ability to use ICT services to perform the required learning activities at the School of KRC.

The results of the survey and interviews also indicate that the majority of students are satisfied with teachers' ability to use ICT and e-services effectively and efficiently to deliver the lessons. However, a considerable number of students are not very satisfied with their own ability to use ICT services to perform the required learning activities.

The results of the survey and interviews also indicate that ICT products and e-services available at the School of KRC, are effective and assist teachers to teach and students to learn effectively and efficiently. However, the number of ICT products available, including computers, is not high enough for the number of the users. Further, ICT products and e-services provided at the School of KRC does not cover the specific needs of the students neither assist students with special needs.

According to survey outcomes and discussions many students are not effective at using ICT services to perform the required pedagogical activities, due to the fact that the students do not use regularly ICT services to carry out the required learning activities. Despite the fact that many students like to use regularly ICT services to perform the required learning activities, the School has not enough ICT products and services available to cover the specific needs of the students.

However, the number of the students attending the School of KRC depends on the number of asylum applicants living in the KRC premises. The number of the students attending the School of KRC changes constantly, do not allowing a definitive design regarding ICT equipment, teachers or classrooms for the School. The administrators of the School have to be agile and adopting new design and methods according to the situation at each moment.

6 RECOMMENDATIONS

The improvement of the effectiveness of ICT products and users' ability to use ICT and e-services to perform the required pedagogical activities enables the achievement of the quality of services required at the School of KRC. A set of recommendations for the improvement of the service quality delivered at the School of KRC are presented in this chapter.

According to the survey and interviews, many users, mainly students, are not satisfied with the number of ICT products available, including computers, and their own ability to use ICT services to perform the required pedagogical activities at the School of KRC. In order to mitigate this situation the School of KRC could:

- Acquire adequate ICT products and services corresponding to the number of users, equip the classrooms with the ICT products, including computers, in order to enable each student to use ICT services when needed to perform the required pedagogical activities at the School of KRC.

- Provide teaching and learning sessions online, such as iLinc, which also save administered lessons, to allow students who cannot be regularly at the School premises to attend the lessons virtually, or to follow the lessons saved any other time suitable for them.

- Create a computer room where students can use ICT services to perform the required learning activities out of the time reserved for schooling; this will help the students who like to spend more time studying than the time specified by the School. In this room the access to computer can be granted by the provision of a username and password to allow the surveillance of the activities performed by each user.

- Have an ICT expertise team to perform regular maintenance and updates of the ICT products and services available, and to assist the users

to use ICT and e-services effectively and efficiently to perform the required pedagogical activities designed by the School of KRC. If necessary, the ICT experts can create a system which requests to the user the provision of a username and password to grant access to certain ICT products for better control and privacy policy.

This study and the set of recommendation for the improvement of the service quality provided at the School of KRC, aims to maximize the exploration of the usability of ICT services for educational purposes. The ultimate aim of this research is to make it possible for the School under research to educate as many people as possible, taking advantage of the perpetually innovative ICT arena.

7 CONCLUSIONS

Since education is a key factor to develop the humanity, it is necessary to look into all means to educate people, providing equal opportunity for everyone to learn without any kind of discrimination. This work explored the importance of ICT and e-services which can be used to provide education quickly and easily.

This study presented definitions of usability and ICT and performed exploratory research to describe the concepts of usability of ICT and pedagogical usability of ICT. Further, this study described adequate use of ICT and e-services for educational purposes, in order to discover technologies, techniques and methods which can be employed to explore the abilities of teachers and students to use ICT services effectively and efficiently to perform the required teaching and learning activities.

This research analysed educational institutions which use ICT and e-services effectively and efficiently maximizing their educational scope. Analysing such educational institutions, the administrators of the School in study, can be provided with recommendations to improve the effectiveness of their ICT services. Adequate ICT services allow teachers to increase the educational scope, and consequently enable students to develop or improve their abilities to use ICT services effectively and efficiently to perform the required learning activities at the School of KRC.

This research performed analyses of the ICT products and e-services available and used at the School of KRC, the educational institution in study, as well as the ability of the users to use ICT and e-services effectively and efficiently to perform the required activities for educational purposes. Relevant data were collected through a questionnaire survey, interviews and discussions.

The employment of SERVQUAL methodology enabled the researcher to discover and analyse the gaps between users' expectations and perceptions regarding the service quality provided at the School of KRC. Based on the results

of the analysis and studies, the researcher put forward a set of recommendations for the enhancement of the effectiveness of the ICT products, and the users' ability to use ICT and e-services effectively and efficiently to perform the required pedagogical activities at the School of KRC.

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APPENDICES

Appendix 1
1 (4)

SURVEY FORM – TEACHERS

This questionnaire aims to perform a thorough analysis in each dimension proposed by the SERVQUAL methodology to discover the teachers' levels of satisfaction concerning the effectiveness of ICT products, and the users' ability to use ICT and e-services effectively and efficiently to perform the required pedagogical activities at the School of Kemi Reception Center (hereinafter KRC).

PERSONAL INFORMATION

1. Age group: 15-24, 25-34, 35-44, 45-54, 55+
2. Educational background:
3. Gender:
4. Time of teaching experience:

RELIABILITY

5. In your experience, does the School administration assist the teachers to use ICT and e-services effectively and efficiently to perform pedagogical activities?
6. Are you able to use ICT and e-services effectively and efficiently to perform pedagogical activities required by the School of KRC?
7. In your experience, are the School ICT products reliable to help users perform activities effectively and efficiently?
8. Are you able to use ICT and e-services effectively and efficiently to perform pedagogical activities within the time planned?

RESPONSIVENESS

9. In your experience, does the administration of the School provide prompt assistance to the teachers when they need quality ICT and e-services to perform activities effectively and efficiently?
10. Are you able to use effectively and efficiently ICT and e-services to deliver teaching material and lessons in a short period of time?
11. In your opinion, are the classroom, the facilities and the ICT of the School of KRC adequate for the teachers and the students to perform the required activities?
12. Are you able to use the School facilities and products to apply your skills to handle ICT and e-services to perform pedagogical activities effectively and efficiently?

EMPATHY

13. In your experience, does the School of KRC provides conditions for the students with special needs such as pregnant or disabled persons to study through the use of ICT and e-services?
14. In your experience, do the students with special needs have an easy access to use ICT services to perform effectively and efficiently required school activities?
15. In your opinion, do the teachers at the School of KRC pay enough attention to the students with special needs to enable them to use ICT services adequately to perform effectively and efficiently required activities?
16. In your experience, are the students with special needs able to use ICT services effectively and efficiently to perform school activities?

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3 (4)

ASSURANCE

17. In your opinion, can the teachers' willingness and skills to use ICT and e-services to teach assist the students to improve their ability to use ICT services to perform school activities?
18. In your experience, have the techniques and methods used by the teachers helped the students improve their skills to use ICT services to perform effectively and efficiently required school activities?

TANGIBLE

19. In your experience, are the classrooms, the equipment, the ICT and e-services of the School of KRC adequate for teaching and learning?
20. Are you able to use ICT and e-services effectively and efficiently to deliver pedagogical material and teach at the School of KRC?
21. In your opinion, do the disposition of the teachers and the students in the classroom when using ICT and e-services permit them to explore effectively and efficiently their ability to use ICT and e-services to perform required activities?
22. Are you able to explore effectively and efficiently your abilities to use ICT and e-services in the classroom along with the students?

SATISFACTION LEVEL

23. What is your general level of satisfaction regarding your ability to use ICT and e-services to perform pedagogical activities at the School of KRC?

Highly satisfied_____
Satisfied_____
Dissatisfied to an extent_____
Completely dissatisfied_____

4 (4)

24. What is your general level of satisfaction regarding the students' ability to use ICT services to perform the required learning activities?

Highly satisfied_____
Satisfied_____
Dissatisfied to an extent_____
Completely dissatisfied_____

25. What is your general level of satisfaction regarding the effectiveness of ICT and e-services used at the School of KRC to assist teachers and students to perform the required pedagogical activities effectively and efficiently?

Highly satisfied_____
Satisfied_____
Dissatisfied to an extent_____
Completely dissatisfied_____

Appendix 2
1 (4)

SURVEY FORM – STUDENTS

This questionnaire aims to perform a thorough analysis in each dimension proposed by the SERVQUAL methodology to discover the students' levels of satisfaction concerning the effectiveness of ICT products, and the users' ability to use ICT and e-services effectively and efficiently to perform the required pedagogical activities at the School of Kemi Reception Center (hereinafter KRC).

PERSONAL INFORMATION

1. Age group: 15-24, 25-34, 35-44, 45-54, 55+
2. Educational background:
3. Gender:
4. Student group:

RELIABILITY

5. In your opinion, do the teachers at the School of KRC assist the students to use effectively and efficiently ICT services to perform school activities?
6. In your experience, are you able to use ICT/e-services efficiently to perform school activities?
7. Are the School ICT services reliable to perform activities effectively and efficiently?
8. Are you able to adequately use ICT to perform school activities efficiently within the time?

RESPONSIVENESS

9. In your opinion, do the teachers help students when students need assistance to use ICT services to perform activities effectively and efficiently?
10. Are you good at using ICT services to perform school activities faster than without ICT services?
11. In your opinion, are the classrooms, the facilities and the ICT of the School of KRC adequate to students and teachers to perform effectively and efficiently required activities?
12. Are you able to use the School facilities and products to explore your skills to use ICT services to perform school activities effectively and efficiently?

EMPATHY

13. In your opinion, does the School provide conditions for students with special needs, such as pregnant or disabled persons, to study through the use of ICT services?
14. In your experience, do students with special needs have an easy access to use ICT services to perform school activities?
15. In your opinion, do the teachers pay enough attention to students with special needs to enable them to use ICT services adequately to perform required school activities?
16. In your experience, are students with special needs able to use ICT services to perform school activities?

ASSURANCE

17. In your opinion, do the teachers' willingness and skills to use ICT services to teach help the students to improve their ability to use ICT services to perform school activities?

3 (4)

18. In your experience, do the techniques and methods used by the teachers help you improve your skills to use ICT services to perform the required school activities?

TANGIBLE

19. In your opinion, are the classrooms, the equipment, and ICT services of the School of KRC adequate for teaching and learning?

20. Are you able to use adequately ICT services at the School of KRC to learn?

21. In your opinion, do the disposition of teachers and students in the classroom when using ICT services help them explore adequately their ability to use ICT services to perform the required activities?

22. Are you able to adequately perform activities using ICT services along with your colleagues and teachers?

SATISFACTION LEVEL

23. What is your general level of satisfaction regarding your ability to use ICT services to perform the required learning activities at the School of KRC?

Highly satisfied_____
Satisfied_____
Dissatisfied to an extent_____
Completely dissatisfied_____

24. What is your general level of satisfaction regarding the teachers' ability to use ICT services to perform teaching activities at the School of KRC?

Highly satisfied_____
Satisfied_____
Dissatisfied to an extent_____
Completely dissatisfied_____

4 (4)

25. What is your general level of satisfaction regarding the effectiveness of ICT products at the School of KRC to assist teachers and students to perform activities effectively and efficiently?

Highly satisfied_____
Satisfied_____
Dissatisfied to an extent_____
Completely dissatisfied_____

Appendix 3
1 (2)

INTERVIEW FORM – TEACHERS

This interview aims to discover gaps between expectations and satisfaction regarding the ability of the teachers and the students to use ICT services to perform effectively and efficiently the required pedagogical activities at the School of Kemi Reception Center (hereinafter KRC).

PERSONAL INFORMATION

1. Age group: 15-24, 25-34, 35-44, 45-54, 55+
2. Educational background:
3. Gender:
4. Teaching time experience:

ICT USE BACKGROUND

5. Have you used ICT and e-services before starting teaching at the School of KRC?
6. What type of ICT and e-services have you used?
7. In your experience, were you efficient at using ICT/ e-services?
8. Did the use of ICT/e-services help you perform the required activities?

CURRENT USE

9. Do you use ICT/e-services to deliver learning material and to teach at the School of KRC?
10. What type of ICT/e-services do you use?
11. Are you efficient when using ICT services?
12. Do ICT services help you in providing students with learning materials and in teaching better?

2 (2)

13. How would you assess your performance when you use ICT services to teach?
14. In your opinion, should the School enhance the quality of ICT services to help the teachers improve the delivery of their lessons?
15. In your experience, does the use of ICT services help the teachers deliver their lessons better and effectively than without using ICT services?
16. Are you satisfied with your ability to use ICT to teach at the School of KRC?
17. In your experience, does the School need ICT support staff or staff with expertise to assist teachers and students to handle ICT and e-services adequately when they have difficulties?
18. What kind of support could you suggest?

AVAILABILITY OF ICT SERVICES AT THE SCHOOL OF KRC

19. In your experience, is the number of ICT devices, including computers, high enough for teachers to teach and students to learn?
20. In your experience, should the School of KRC acquire more ICT devices, including computers, to assist teachers to teach and students to learn?
21. In your experience, is the quality of ICT devices and software used at the School of KRC adequate to help students and teachers perform effectively and efficiently required activities?
22. In your experience, should the School of KRC acquire better ICT devices and software in order to help more students and teachers to perform effectively and efficiently required activities?

CONSIDERATION OF STUDENTS WITH SPECIAL NEEDS

23. In your opinion, should the School of KRC provide ICT and e-services technology to enable teachers to teach students online if they are not able to regularly participate in work at the School premises?
24. What kind of technology would you suggest?

Appendix 4
1 (3)

INTERVIEW FORM – STUDENTS

This interview aims to discover gaps between expectations and satisfaction regarding the ability of the teachers and students to use ICT services to perform the required teaching and learning activities at the School of Kemi Reception Center (hereinafter KRC).

PERSONAL INFORMATION

1. Age group: 15-24, 25-34, 35-44, 45-54, 55+
2. Educational background:
3. Gender
4. Student group:

ICT USE BACKGROUND

5. Have you used ICT services before?
6. What type of ICT services have you used?
7. Were you good at using ICT services?
8. Did you use ICT services to perform learning activities?

CURRENT USE

9. Do you use ICT services to learn?

IF YES

10. What type of ICT services do you use?
11. Are you good at using them?

2 (3)

12. Do ICT services help you complete school tasks?
13. How would you assess your performance when you use ICT services to learn?
14. In your opinion, should the School improve its ICT services?
15. In your experience, does the use of ICT services help the teachers to deliver better the lessons?
16. Are you satisfied with your ability to use ICT services to learn at the School of KRC?

IF NOT

- Would you like to use ICT services to learn?
- What kind of ICT equipment and software would you like to have and use at the School to help you to learn?
- In what ways could ICT services help you learn?

AVAILABILITY OF ICT SERVICES AT THE SCHOOL OF KRC

17. In your view, is the number of ICT devices, including computers, high enough for students to learn?
18. In your opinion, should the School acquire more ICT devices, including computers to assist students to learn?
19. In your opinion, is the quality of ICT devices, including computers and software, used at the School of KRC adequate and help the students perform activities effectively and efficiently?
20. In your opinion, should the School acquire better ICT devices, including computers, and software more adequate than at present in order to help more students to perform activities effectively and efficiently?

3 (3)

CONSIDERATION OF STUDENTS WITH SPECIAL NEEDS

21. In your opinion, should the School provide ICT and e-services technology to teach students online if they are not able to regularly participate in work at the School premises?
22. What kind of technology would you suggest?

NUMBER OF QUESTIONS

If a student uses ICT services to learn: 22
If a student does not use ICT services to learn: 18