A Critical Analysis on Implementation of e- Learning in General Education of Sri Lanka

Research Team

Mr. I. Kailasapathy, Asst. Lecturer, Dept.of Commerce, National Institute of Education
Mr. A. Nithlavarnan, Senior Lecturer, Department of Education, University of Jaffna.
Mr. K. Sarveswaran, Lecturer, Department of Computer Science, University of Jaffna.
Mr. S. Parakramawansa, Deputy Director of Education Provincial Department of Education,
Southern Province

Department of Research & Development
National Institute of Education
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ABSTRACT

E-learning has become an increasingly important learning and teaching mode in recent decades and has been recognized as an efficient and effective learning method. The rapidly rising number of internet users with smartphones and tablets around the world has supported the spread of e-learning, not only in higher education and vocational training institutions, but also in primary and secondary schools. The objective of the study, is to explore current levels of implementation and the factors influencing the implementation of e-learning for teaching and learning at schools in the Northern Province.

The Mixed method approach was employed for the study. Qualitative data was obtained through focus group discussions conducted with teachers and students. The key informant interviews were conducted with Assistant Directors of Education, Deputy Directors of Education from Zonal Education offices and Provincial Department of Education and Zonal Education Offices from the Northern and Southern province. The Delphi techniques were also adopted for data collection. The panel was comprised of educational experts, principals and teachers. The questionnaires were designed with readiness levels from 1 to 5 (1-ready to go ahead and 5 -not ready needing plenty of work, expected level of readiness 2.6). The Thematic data analysis approach was adopted for qualitative data . For quantitative data analysis, the descriptive statistics method was utilised.

The findings reveal that the current level of e-learning implementation is at an initial stage in the general education system of Sri Lanka. This is due to fewer projects being initiated and lack of availability of digitalized content in Sinhala and Tamil mediums. Student and teacher access to available content is also limited. The factors that influence e-learning implementation are areas such as policy, people, pedagogy, resources, technology and institutions of general education in Sri Lanka. Further quantitative findings, indicated that general education in Sri Lanka needs to be prepared to adopt e-learning for the teaching and learning process. Components of readiness were ranked thus: Students (M = 3.4) Teacher (M = 2.8) Principals (M = 1.64) Schools (M = 3.5) Zonal (M = 3.1) and Provincial readiness (M = 2.9).

Key words: E-learning, School, Teaching and Learnig

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ABBREVIATION

PDE – Provincial Director of Education

ADE - Assistant Director of Education

DDE - Deputy Director of Education

EMIS - Education management Information system

LMS - Learning Management System

IT- Information Technology

ICT – Information Communication Technology

MOE- Ministry of Education

GOSE – Government of Sri Lanka

NCOSE – National College of Education

NIE – National Institute of Education

FGD – Focus Group Discussion

KII – Key Informant Interview

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CHAPTER 01 :

INTRODUCTION

1.1 Introduction

In this Chapter, the first part outlines the background to the research problem, research objectives, and research questions. The next part covers the importance and structure of the report.

1.2 Background of the Study

E-learning may have a greater potential in developing countries than in developed countries due to the abundant need for education to speed-up development and the potential for enrolment of students. According to a 2006 UNESCO report, the use of Information and Communication Technologies (ICTs) for dissemination of education is believed to have vast potential for governments struggling to meet the growing demand for education whilst facing an escalating shortage of teachers and resources at schools (UNESCO 2006). In addition, learning methods have also evolved into computer -based learning. Such learning methods indeed play a vital role in sharing views and knowledge amongst communities. As has been rightly pointed out "This is where the e-learning concept emerged in the scenario as an accepted instrument to enhance and support traditional teaching methods" (Premarathne, Ranasinghe, and Kithsiri 2016). E-learning is simply defined as learning which takes place with the assistance of digital technology. The rapid growth of e-learning over the last 15 year, and its increasing acceptance, presents educators with an opportunity to transform education and the needs of a much broader, diverse group of learners, than has been served in the past.

The recent growing trend of e-learning is mostly beneficial to the developed countries due to predominant facilities like infrastructure, technology, relevant content and responsive learner community (Gunawardana, 2005). If education and capacity-building are critical steps for entering into the new global economy, e- learning should

be considered a critical facet of basic development, an alternative medium of capacity-building and a means to people's empowerment (Gunawardana, 2005)

The success of e-learning in the developing world is dependent on the existence of infrastructure, level of connectivity and internet access. The most common barriers encountered are; unreliable internet connectivity and phone lines, slow access to web sites due to narrow bandwidth and the limited number of computers connected to the internet (Gunawardana, 2005). To meet the promises and potential of e-learning in developing countries, many challenges must be addressed in its implementation stage. These include underlying economic, governance and infrastructure issues, and difficulties faced by the educational system its self. At an individual country level, investments in primary and tertiary education in developing countries continue to be low, relative to their need (Olson, et al 2011). Further, the developing countries face more challenges like lack of infrastructure, trained instructors, and financial support, Government policies and less student readiness (Reddy, & Naresh, 2015).

Similarly, in setting priorities for the learning systems, developing countries like Sri Lanka it is based on traditional learning mechanisms and e-learning has not yet become an important agenda for the government to address (Akbar, 2005). But e-learning provides more opportunity since it is in a developing stage (Reddy, & Naresh, 2015). It increases productivity to maximum level with minimum effect by using ICT, through which knowledge can be shared across the world. If proper steps are adoted, the challenges and the differences between the developed and developing countries can be minimized to a greater extent in implementation of e-learning in higher- education. (Reddy, & Naresh, 2015). There is research evidence highlighted by Dodd (2009), where he found that that first year university performance and persistence is significantly different for students who have previous experience with e-learning education experience and those who do not.

1.3 Potential of E-Learning in Developing Countries

In developing countries, e-learning plays vital role and has made important potential contributions of e-learning programs in developing countries according to Olson, et al, (2011). These include:

1. Addressing the shortage of teachers, especially in science and other specialty teachers as well. E-learning could provide high quality teaching material, such as videos, interactive software or information from a "cloud" on the Internet or a local computer. Moreover, with a distant classroom or video conferencing approach, the number of students who receive live- instruction from teachers in specialty subjects can be much larger.

2. Addresing shortages of learning material such as textbooks for students. The material could be made available on hand-held devices such as e-readers or mobile phones. Interactive features such as quizzes or games could improve the level of learning and understanding.

3. Improving the quality of education by providing improved information content and learning approaches. Interactive, communicative e-learning may promote the development of skills in students (so called "21st Century Skills") such as critical thinking and problem solving, communication, collaboration and creativity.

4. Providing students with information and communications technology skills. Graduates will be then better equipped to contribute to the knowledge-centered globalized economy of their countries.

The goal of improving the educational quality and economic impact of secondary school education is coming to the fore in many developing countries as their efforts to expand the number of schools and students are bearing fruit. Improving quality and gaining impact is, however, perhaps more difficult as it may require a transformation of the educational system itself. Many countries in Africa and elsewhere are turning to e-learning programs to assist with this transformation, and to fill some immediate gaps in their schools such as a lack of teachers and learning materials (Olson, et al, 2011). Sri Lanka too faces similar problems such as shortage of teachers especially for Science and Maths subjects in rural schools. Therefore, the Sri Lankan

Government has adopted several measures to improve the quality of education. E-learning is one of the initiatives for improving the quality of education in rural schools. There are number of projects initiated by the Government of Sri Lanka.

1.4 E-Learning Initiative by Sri Lanka General Education System

In the 21st Century, Sri Lanka and many other countries in Asia have shown a rapid but heterogeneous development in the field of the Information and Communications Technology (ICT). The difference in impact on urban regions and rural areas has sometimes been described as the internal digital divide. The General Education systems have taken a few initiatives to bridge the gap in Sri Lanka such as One Laptop Per Child (OLPC), Nenasa Telecentre network (Mozelius, et al (2011) , E-Thaksalawa and the SMART classroom.

One to One Computer-The term one-to-one computing has lately been frequently used and the main idea of this concept is to equip every student in primary school with a personal computer. In many countries, this move has been combined with providing the students internet access to enable the search for information and to share content. In the so called "e-villages" the Intel Class Mate computers were provided in combination with the use of Internet in the Primary school curricula. The computers were distributed with digital learning objects and Intel has given support for computer maintenance. In the Sri Lankan One Laptop Per Child (OLPC) initiative, the focus was not on Internet access or connecting the XO computers to a network. The Sri Lankan Ministry of Education did not follow the recommendations from the OLPC foundation and had chosen their own model instead where emphasis was on content development in the island's local languages (Mozelius, et al , 2011).

E-Sri Lanka and the Nenasa Telecentre Network- Several ICT initiatives have been launched by the Information and Communication Technology Agency of Sri Lanka (ICTA) under the umbrella of e-Sri Lanka. The main objectives of the e-Sri Lanka initiatives are to "develop the economy of Sri Lanka, reduce poverty and improve the quality of life" (e-Sri Lanka, 2011). Since the inception Sri Lankan telecentres have had a wide variety of models and organizations. 'Nenasa' is a word of Sinhala origin which means a centre for knowledge, and thus Nenasa has been introduced as the brand name for about 600 community driven Telecentres in rural Sri Lanka. Their

overall aim is to bridge the internal digital divide and to promote local commerce and culture. The national network of telecentres was developed by the Sri Lankan Information and Communications Technology Agency (ICTA), with the aim of opening and establishing 1000 telecentres in rural regions. A Nenasa telecentre could be equipped in different ways but generally with 2-4 computers and a printer. Many telecentres, but not all, have internet access by satellite (Meegammana et al, 2010). During the first year of establishment, the telecentres normally have their Internet bills paid by ICTA, during the second year with 50% support and thereafter subsidization is phased out in the next two years. The Nenasa could be successful even without internet access but if the Internet link is cut -off, the rate of visitors will decrease and in some rural areas it is hard to find a way to get Internet access to affordable prices (Mozelius, et al , 2011). Common services available in these telecentres are training in basic computer science and how to use Office packages. It is also common to conduct courses in digital design and image handling.

E-Thaksalawa- The ICT branch of the Ministry of Education, has initiated this programme which consists of resources developed aligned to the grade 1 - 13 curriculum as creative lessons. The learning resources including past papers, term papers, syllabi, text books, and teachers' instructional manuals in pdf format including animated e-content. This Learning Management System is on offer free of charge for those who in search of knowledge such as students, teachers and educationists. It is only accessible through the internet. The rural schools and student face difficulties in accessing this programme, due to the lack of internet facilities.

1.5 Problem Statement

As has been pointed out, after the rapid spread of the internet in the 1990s, e-learning has spread tremendously and has attracted much attention over the last decade in Sri Lanka (Premarathne, Ranasinghe & Kithsiri, 2016). Although the government has initiated several projects to enhance e-learning in Sri Lanka, and e-learning is integrated into the Sri Lankan Education system to bridge the digital divide and provide solutions to some of the educational challenge experienced by schools, but it did not reach expected level to schools (Mozelius, Hewagamage, & Hansson, 2011). Further the Northern Province implements e-learning for O/L and A/L Science stream

students since 2014, but the Annual report of Ministry of Education indicates that schools face difficulties in implement e-learning in the Northern Province (MoE, NP 2017). At present, these developments indicate that implementation of e-learning faces difficulty in Sri Lanka. But, recent research revealed the balance between traditional teachings to modern teaching has changed over the years (Cox -2013). Currently, face to face teaching is the main concept and e-learning is optional for enhanced teaching methods, but in the future, e-learning will become the main concept. The speed of global technological and economic transformation demands urgent action to turn the present digital divide into economic transformation (Gunawardana, 2005). Sri Lankan internet users figure reached 6.2 million persons at the end 2017, and reflects approximately 30 per cent penetration. Sri Lanka possesses a   suitable network infrastructure and backbone for content delivery. Aided by these and the critical need, Sri Lanka has very fertile environment for e-learning to grow (Wijesiri, 2018), but Sri Lanka encounters difficulties for effective implementation of e-learning at schools. Consequently, the study mainly focuses on exploring the contextual factors facilitating for the implementation of e-learning at schools in Sri Lanka

1.5 Research Objective

The overall objective of the study is to identify the contextual factors facilitating the implementation of e-learning at schools in Sri Lanka

1. To explore state-of-the-art in regard to trends and practices of e-learning for teaching and learning at school in Sri Lanka
2. To identify factors facilitating the usage of e-learning for teaching and learning at schools in Sri Lanka
3. To identify the level of preparedness of schools for teaching and learning through e-learning in Sri Lanka
4. To recommend strategies to implement e-learning effectively at schools in Sri Lanka

1.6 Research Questions

1. What is the state-of-the-art in regard to trends and practices of e-learning at schools in Sri Lanka?

2. What are necessary factors for facilitating effective e-learning at schools in Sri Lanka

3. To what extend are schools prepared for teaching and learning through e-learning in schools in Sri Lanka?

4. What are the strategies for implementing e-learning effectively at schools in Sri Lanka?

1.7 Significance of the Study

The rapid expansion of information and communication technology enabled human life to become much easier and more efficient. Its influence has reached all quarters including education, therefore governments of most of the countries have begun to give priority to deliver education with the most expedient methods. One such method is the use of e-learning. The success of e-learning implementation depends of many factors that it is influenced. Therefore, this study, mainly focuses on identifying such factors influencing e-learning implementation. Further, there are vast literature gaps on e-learning concepts in Sri Lanka and this study endeavours to add important knowledge i this field and offer appropriate and relevant recommendations to policy makers and educational professionals in Sri Lanka.

1.8 Report Structure

The report is organized into five Chapters. In **Chapter 2**, Reviewed and synthesized research literature that is relevant to this study, has been included. Based on insights from theories and other key resources from the literature review, a conceptual model for this study is thus presented

In Chapter 3, it covers research method and the research design including an overview of sample, data collection and analysis of this study.

In **Chapters 4**, the findings of the study is presented, which includes both qualitative and quantitative information.

In the final **Chapter 5,** the findings presented in Chapters 4 are synthesized and discussed

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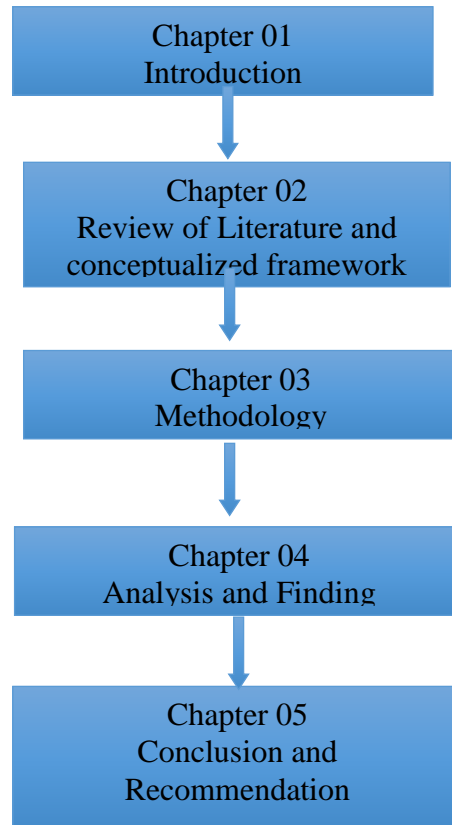
CHAPTER 02 : LITERATURE REVIEW AND   CONCEPTUAL FRAMEWORK

2.1 Introduction

The first part of the chapter includes the e-learning concepts encompassing e-learning approaches, pedagogy for e-learning, importance of e-learning for the development of a country and possible future direction of e-learning. The second part of the chapter reviews the theoretical model and factors facilitating implementation of e-learning. The third part covers the assessing the readiness for the implementation of. The final part consists of the conceptual framework for the implementing e-learning in Sri Lanka.

2.2 Concept and Definition of E-Learning

In the early 60's with the emergence of computers, Skinner coined the phrase "teaching machines". Later in the 80's and more so in the 90's, as the personal computer began its domination, the concept of including training material on a computer and teaching a student, was termed computer - based training. In 1993, Graziadei officially recorded the first online lecture through the Virtual Instructional Classroom Environment in Science (Cross, 2004). The specific term 'e-learning' however was created in 1998 by Cross, a veteran of the software industry. Subsequently, many have used the term differently according to the contexts of their environment. However, the general idea that e-learning is the use of information technology adopted in the learning process, can be derived from the name 'e-learning' itself. Abel (2005) described that e-learning can have different meanings to different people and that we cannot specify a generalized definition. This aspect demonstrates the dynamic nature of e-learning. Many terms are used interchangeably in the field of e-learning, such as online learning, blended learning, hybrid learning, virtual schools, and cyber schools. In addition, e-learning can be defined as the use of computer and internet technologies to deliver a broad array of solutions to enable learning and improve performance (Ghirardini, 2011). E-learning is the use of internet technologies to uplift knowledge and performance. It provides control over material, learning order, pace of learning, time and often media, allowing them to tailor their experience

to meet their personal learning objectives. (Jorge, Mintzer, and Leipzig 2006). Further, multiple definitions were given to e-learning. In a recent study on the definitions of e- learning, Sangrà et al (2001) defined four categories of definitions related to the applications of e-learning, such technology driven, delivery system oriented, communication oriented, and as an educational paradigm by itself.

Technology Driven: E-learning as the use of technologies as a means to facilitate access to learning.

Delivery system orientated: E-learning mainly as a means of accessing and delivering education and training and contents (for learning, teaching and knowledge). In other words, e-learning is wide set of applications and processes that uses the available electronic media to access education and training

Communication orientated- E-learning is a tool exchange and collaboration pushing its technological or educational aspects into the background. Further, e-learning is also defined as the use of communication systems via computer in which certain people communicate, exchange information and interact for educational purpose.

Education driven- E-learning is also conceptualised mainly as a new way of learning and teaching or as a way of improving the existing education paradigm. Further e-learning is defined as a system of teaching and learning that uses new multimedia and internet technology to improve the quality of learning, by facilitating access to resources and services and to interaction and cooperation. In the educational paradigm, Khan (2010) defined e-learning as as :

> *" E-Learning can be viewed as an innovative approach for delivering well-designed, learner-centered, interactive, and facilitated learning environment to anyone, any place, any time, by utilising the attributes and resources of various digital technologies along with other forms of learning materials suited for open and distributed learning environment" (pp-42).*

In view of Khan definition, e-learning applications and processes include web-based learning, computer-based learning, virtual classrooms and digital collaboration. Content is delivered via the internet, intranet/extranet, audio or video tape, satellite TV, and CD-ROM. It can be self- paced or instructor - led and includes media in the

form of text, image, animation, streaming video and audio (Bencheva, 2010). Further, e-learning is a generic term used to describe a wide range of applications of electronic technologies (TV, radio, CD-ROM, DVD, cell phone, Internet, etc.), in study environments, with a special emphasis on learning through the web (Rosenblit & Gros, 2018).

E-learning as a new paradigm, shifts higher-education from the instructor-centred process to a learner- centred approach and enhances the quality of teaching and learning. E -Learning allows digitized educational materials to be swiftly and efficiently delivered to students. The self-paced aspect of e-learning gives students a chance to access educational materials any time, any place and choose tools appropriate to their different needs (Ahmed, 2003). In the last two decades, hundreds of scholarly articles, books, conferences and symposia have been devoted to examining the rich plethora of uses of e-learning in educational settings from the kindergarten to universities, from the public sector to the private and corporate worlds (Rosenblit & Gros, 2018). It must be emphasised here that there is a absence of relevant definition for e-learning especially the field of general education in Sri Lanka. Hence, for the current study purpose, we propose to utilise the following :

"it is operationally defined for e-learning inside and outside of schools classroom, as a type of teaching and learning method that delivers educational material electronically to support students, goals and enhance knowledge transfer. In this connection, students and teachers use as a tool for e-learning, such as internet, intranet, extranet, satellite, broadcast, audio/video tape, interactive TV, CD–ROM, pen drive, all kind of learning management system (LMS), and all types of soft form of document; form of text, pdf or presentation (PowerPoint), image and animation. Further, it considers modes of e-learning: flipped classroom method, blended learning method, SMART classroom, Multi media room, and computer labs. The devices are applicable; computer, laptop, Tab, SMART TV &TV, SMART Board, multimedia, SMART phone, Tape, Radio and any electronic devices".

In this definition, e-learning refers to an integration of pedagogy, content, and technologies within a teaching and learning context. E-learning can, therefore, include

face-to-face (f2f) classrooms in which information technologies (e.g. learning management systems, video-conferencing and web-conferencing, mobile devices, multimedia and simulation, et al) are used for learning and teachers at classroom in schools.

2.3 E-Learning Approaches and Mode of Delivering

The modern e-learning approaches lead toward a revolution in education, allowing learning to be individualized (adaptive learning), enhancing learners' interactions with others (collaborative learning) (Jorge, Mintzer, & Leipzig, 2006), Ghirardini, (2011) divided into two approaches into self-paced and facilitated/instructed-led.

The self-paced E-learning-Learners are offered e-learning courseware which can be complemented by supplemented resources and assessments. Course materials are included on web servers and learners use it from an online platform or CD-ROM. This approach supports learners to choose their own study path depending on their need or requirement or interest.

Instructor - led and facilitated e-learning-The learners' curriculum is developed in such a manner that it is integrated with several resources and activities linked the syllabus. These courses are scheduled and led by lecturer or teachers. These may contain individual assignmenst and collaborative practical activities among learners. In addition, Hyder et al, (2007) developed approaches termed, Synchronous and Asynchronous.

Synchronous learning – It is live, real-time (and usually scheduled), facilitated instruction and learning-oriented interaction. Synchronous e-learning is synchronous learning that takes place through electronic means. (Hyder et al, 2007).

Synchronous learning is distinguished from self-paced asynchronous learning, which students' access intermittently on demand. The following Table 2.1 compares synchronous e-learning to asynchronous e-learning. These terms don't always apply clearly to specific examples. Creating and attending a synchronous e-learning session can involve asynchronous experiences (pre-registering or conducting a diagnostic technical check), but the learning experience is live and real-time. The term "blended learning" can refer to a combination of synchronous and asynchronous experiences.

For clarification, blended learning is also applied to mixed online and face-to-face learning and more generally to approaches to course design and delivery that combine different modalities (e.g., self-paced Web-based training, followed by classroom instruction, accompanied by printed jobs (Hyder et al,2007).

Table 2.1: Different between Synchronous vs Asynchronous E-Learning

Synchronous vs Asynchronous E- Learning		
Synchronous E-Learning	Real time	Instant messaging
	Live	Online chat
	Usually scheduled and time specific (but can be impromptu)	Live web casting
	Collective and often collaborative	Audio conferencing
	Simultaneous virtual presence (with other learners and facilitators or instructors)	Video conferencing
	Concurrent learning with others	Web conferencing
Asynchronous e-Learning	Intermittent access or interaction	E mail
	Self –paced	Threaded discussion
	Individual or intermittently collaborative	Web- based training
	Independent learning	Podcasting
	Usually available any time	DVD
	Recorded or pre - produced	Computer based training

Source: Adapted from (Hyderet al., 2007).

Further e-learning approaches are divided based on its delivery methods, content , location and format: such as multimedia classroom, computer lab, online learning, distance learning, standalone course, virtual classroom course, learning game and simulation, blended learning, flipped classroom, SMART classroom and m-learning.

*Multimedia Classroom-*In a multi-media classroom, educational content is delivered to students in a one-to-many approach. This is cost efficient per pupil, and can provide a large amount of educational resources to students. Classrooms would be equipped with a projector, screen (or large LCD), speakers and a classroom computer. The teacher could display various types of content that is housed either on the

classroom computer or on the teacher's laptop or other device. The teacher would be able to adapt and project various content (i.e. videos, PowerPoint slides, augmented reality, multimedia presentations, the teacher drawing a graph.) A 'connected' classroom would have wireless or wired communications to a "cloud" of resources. The teacher would thus have access to a wide range of content from the library on the cloud (Olson et al., 2011). Connected multi-media classrooms would permit distant classroom teaching, in which a teacher in one school or from a studio could deliver live, interactive lectures to classrooms in other schools. The distant classrooms would need to be furnished with video cameras and microphones, as well as projectors and speakers, to communicate with the distant teacher (Olson et al., 2011).

Computer Lab- A computer lab is among the most recognizable forms of e-learning technologies. A computer lab usually consists of many single personal computer stations. This is a common arrangement found in schools throughout the world. There are many educational software packages available that could be installed for student use. Separate stations permit individual students to move at their own pace through material. Teachers can also lead students or student teams through guided exercises, with each following on their own station. Free computer time itself is a valuable educational resource.

Installing separate computers is easy to set up, since it is simply single stations behaving independently. Computer labs can be, however, more expensive per student, due to individual computers and software licenses. They may also have higher power consumption demands, depending on the computer or device, necessitating low-cost power solutions.

Multi-seat computing consists of using one powerful personal computer with extra video cards to support up to eight independent "seats" (each with its own monitor, keyboard and mouse running separately). They can be placed in a computer lab for students or teachers to use, or in classrooms. There are several commercially available multi-seat operating system software options including those by Microsoft and Linux. This system has the advantage of using much less power than the other options. It is usually the least expensive per user as well (Olson et al., 2011).

Online learning- It is teacher-led instruction delivered primarily through the internet that includes software to provide a structured learning environment, and where the student and teachers are separated geographically. Online learning takes place via the Web and may include text, graphics, animation, audio, video, discussion boards, e-mail, and testing. Online learning is typically "on demand" and self-directed but may include synchronous chat, web - based teleconferencing (audiographics), or similar technology (Bencheva, 2010).

Distance Learning- It is learning that takes place when the instructor and the learner are not in the same physical location. It can also take place if the instructor and the learner are in the same location but not at the same time. Today, distance learning is carried out via a number of medias, ranging from snail mail to teleconferencing or the Internet. "Distance Learning" (learner focus) and "distance education" (instructor focus) are often used as interchangeable terms. In reality, however, learning is the result of Education (Bencheva, 2010).

Standalone courses- Courses designed for the solo learner. Consists of self-paced training with no instructor or classmates. (Clark and Mayer 2008)

Virtual-classroom courses: This means an online class structured similar to a normal classroom course. It may include synchronous online meetings. Includes instructor interaction of some kind. (Clark & Mayer (2008)

Learning games and simulations: These include learning activity involving simulated activities. (Clark et al, 2008)

Embedded E-Learning- Learning activities are imbedded in other programs or processes (such as a computer program help feature, or a troubleshooting process or procedure) (Clark et al, 2008).

Blended learning- This means any time a student learns, at least in part, at a supervised brick and mortar location away from home and at least in part through an online delivery with some element of students control over time, place, and pace. Blended learning combines online with face-to-face learning. The goal of blended learning is to provide the most efficient and effective instruction experience by combining delivery modalities. The term "blended learning" is used to describe a

solution that combines several different delivery methods, such as collaboration software, web-based courses, electronic performance support systems (EPSS), and knowledge management practices. Blended learning also is used to describe learning that mixes various event-based activities, including face-to-face classrooms, live e-learning, and self-paced instruction (Bencheva, 2010).

Flipped Classroom-The flipped classroom is a modern teaching and learning method, which facilitates students to learn through e-lessons outside the schools and do practice problems as homework, and active, group-based problem-solving activities in the classroom (Bishop & Verleger, 2013). The Flipped classroom approach has four different elements. It is expressed that in order to teachers achieve this approach, they have to take these four elements into consideration (FLN 2014). The properties of this approach which its English correspondence is "Flip" are explained thus by referring to the first letters.

F - ('F'lexible Environment)-It indicates provision of time and place flexibility of learning.

L - ('L'earning Culture)-In the traditional teacher- centered approach, the source of knowledge is the teacher. In the flipped classroom approach, there is a transition from a teacher- centered approach to a student centered approach.

I ('I'ntentional Content': Flipped classroom educators both think about how education is used to provide fluency and how they can develop cognitive understanding of students.

P ('P'rofessional Educator): The responsibility of flipped classroom educators is more than the ones using traditional approach. Flipped classroom educators continuously observe students during the course, evaluate their studies and make feedbacks (Flipped Learning Network -FLN, 2014).

SMART Classroom-The SMART classroom model proposed by Yang, Huang and Li (2013), is shown in figure 2.1. Not only should the learning contents be seen clearly, but it should also be suitable to the learners 'cognitive' characteristics. Managing of physical environment/instructional materials/students behaviour represents diverse layouts and the convenience of management of the classroom. The equipment, systems, resources of classroom should be easy managed as well as   the layout of the

classroom, equipment, physical environment, electrical safety, network, etc. Access to digital resources represents convenience of digital resources and equipment accessed in the classroom, which includes resource selection, content distribution and access speed. Real-time interaction and supporting technologies, represent the ability to support the teaching/learning interaction and human-computer interaction of the classroom, which involves convenient operation, smooth interaction and interactive tracking. Tracking learning process/ environment represents tracking of the physical environment, instructional process and learning behaviour in the classroom (Yang, Huang & Li, 2013)

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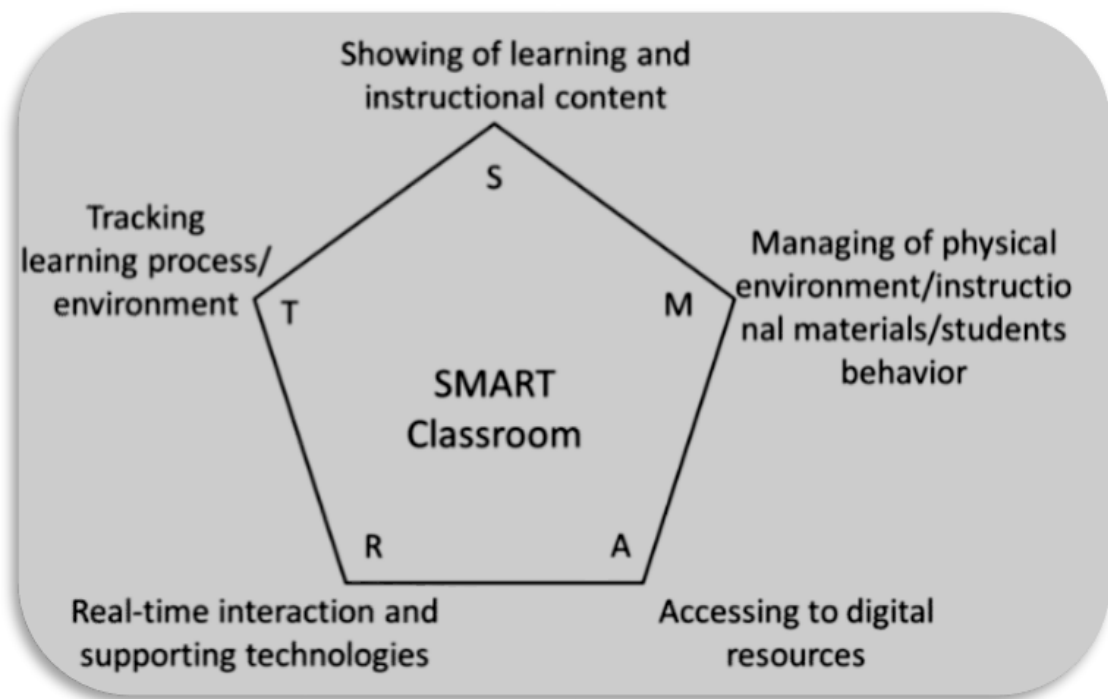
Figure 2.1 Components of SMART classroom
Source: Yang, Huang & Li, (2013)

M-Learning: The term m-Learning or Mobile Learning refers to the use of handheld devices such as PDAs (Personal Digital Assistant), mobile phones, laptops and any other handheld information technology device that can be used in teaching and learning (Bencheva, 2010). _M-Learning is learning delivered via mobile devices and mobile technology. Research indicates that this medium of learning has the potential to enhance formal as well as informal learning (Iqbal & Bhatti, 2015). M-learning can be considered a further step in electronic learning (e-learning) in which learning is

transmitted via wireless mode and mobile devices such as mobile/Smartphones, laptops, personal digital assistants (PDAs), and tablet PCs (Attewell, 2005). M-learning is emerging as a powerful medium delivering knowledge and changing students' expectations of (anytime and anywhere) learning. (Iqbal & Bhatti, 2015).

2.4 Advantages and Disadvantages of E-learning

Anita & Bajpai (2017) posed following regarding advantages and disadvantages

Advantages

1. *Learning at their own pace* – pace of studying the materials is regulated by the subject according to their personal circumstances and desires. *Freedom and student's flexibility of learning* – students can select any of the elective courses, as well as self-assess the time and the duration of their studies.

2. *Availability of learning for everyone* – regardless of ones geographical location and time situation, a student can remotely access higher education in any university that supports these technologies.

3. *Feedback* – effective implementation of the feedback between an educator and a student is an integral part of the learning process.

4. *Workability of the educational process* – teaching based on the latest advances and discoveries of information and telecommunication technologies.

5. *Social equality* – equal opportunities for e-learning, regardless of place of residence, health status, nationality and financial status of the student.

6. Students' creative self-expression in the course of learning.

7. *Availability of teaching materials* – a student gains access to all the relevant references after logging in on the University website or receives educational materials by mail.

8. *E-Learning is cheaper* (due to travel and accommodation savings, and in the case of international universities - visa and passport costs).

9. *Education in a relaxed environment* – intermediate certification of e-learning students is held by means of on-line tests. Therefore, students are less worried about meeting with an educator at the examinations. The possibility of subjective evaluation is excluded: automatic system evaluating the test is not

affected by the students' overall academic performance, social status and other factors.

10. *Individual approach* –The conventional approach doesn't allow an educator to give sufficient attention to all the students in a group or adjust to the individual pace of work. The use of e-learning technologies matches the organization of the individual approach.

Disadvantages

1. Lack of face-to-face communication between students and teachers.

2. Individual and psychological conditions are not taken into consideration in distance learning. E-Learning requires regular rigid self-discipline, but learning outcomes largely depend on independence, skills and self-consciousness of a student.

3. Constant access to the sources of teaching materials (e-books, videos, etc.). Sufficient technical equipment at required, but not everyone, willing to get is home education, has a personal computer and the Internet access. theory training, necessary to

4. The lack of practical consolidation and better knowledge acquisition.

5. The lack of regular students' assessment on the third hand, which is a negative sign for students. Few people can manage to overcome their own laziness.

6. Electronic educational programs and courses are not always well designed and meet all international standards due to insufficient training of specialists.

7. E-learning training, conducted mainly in writing. For some students, the lack of opportunities and requirements to present their knowledge in oral form may result in poor-quality acquisition of knowledge.

8. The need for a personal computer and internet access

2.5 Pedagogy for E-learning

Pedagogy can be defined as the art of teaching. It refers to the strategies, methods and styles of instruction. The adoption of technology adds another element in course - design to consider. To produce, effective e-learning and teaching, requires a comprehension of the processes by which students learn and interact with technology. Further, The term pedagogy is often loosely defined as the art or science of teaching.

Derived from French and Latin adaptations of a Greek term, the word denotes the ancient Greek tradition of having a slave who would lead his master's child to a place of learning -- literally "leading the learner to learn." (Banner, 2014).

While changes in technology have the potential to impact significantly on learning in terms of affording a more open and flexible learning environment, pedagogical practices are fairly resistant to change. In order to actualise the full potential of the technology, an aligned pedagogical approach is needed. The shifts in pedagogy show a movement from practices promoting homogeneity to more open systems where diversity is facilitated and learning is located within personalised authentic life-long and life-wide contexts (Mentis, 2008).

Therefore, there is a need for creating a set of pedagogical principles applicable for e-learning. It was discovered that ICT is not the key aspect influencing effectiveness of e- learning by Šimúth and Hvorecký, (2016). It is more the relation between educators and learners. The approach is based on the premise that good teaching methodologies must develop and expand both forms of learners' knowledge – tacit and explicit. The common principles for e-pedagogy seems to be a crucial step in further development of e-learning. These are usually focused on technological potential rather than on pedagogic and psychological principles. The seven core principles for e-pedagogy were developed on taking into account communication, students' characteristics and student centeredness (Simuth et al , 2016).

The core principles for e-pedagogy is presented here as   a practice of guidelines:

1. Ensure and guarantee frequent and regular contact between the teacher and students as well as among students.
2. Develop reciprocity and cooperation among students.
3. Provide students with more feedback rather than evaluation.
4. Create a positive and supportive learning environment.
5. Include all levels of Bloom's taxonomy in the course plan
   a. Knowledge (facts, terminology, recall of information),
   b. Comprehension (grasping the meaning of concepts and relationships among them, ability to describe them),
      Application (using acquired knowledge in new situations),

  c. Analysis (seeing patterns, recognition of hidden meanings), Synthesis (formulation of hypotheses, solution planning and reasoning),

  d. Evaluation (critical assessment of results, verification of evidence).

6. Respect the diverse talents and learning styles in creating learning activities and materials.

7. Provide students with clear expectations from the beginning of the course.

8. Provide students and teachers with appropriate training for e-learning. The key areas to focus on, are active communication among the participants of the educational process and variability in study activities which reflect the individual differences among students and teachers.

These principles could form the backbone of all e- learning courses, since they promote interactivity, collaboration and active learning. They can be seen as a way to humanize the educational process transmitted by information and communication technology. These principles can contribute to elimination of barriers in learning such as lack of communication with classmates and teachers which result in social isolation passive knowledge acquisition. (Šimúth, et al., 2016). Based on the e-pedagogy, Olson et al, (2011) applied and found a range of pedagogical approaches and electronically supported technologies for e-learning classrooms such as:.

1. One-to-Many (communication between the teacher and the class as a whole)

  a. Online classes. Content can include lecture notes, assignments, message boards, linked bibliographies of readings and websites, quizzes, and chats

  b. The viewing of TV shows, videos or other previously prepared material at a central location

  c. The teacher in a multi-media classroom projecting content using a projector or screen, or using an interactive whiteboard. The content can range from PowerPoint slides, news broadcasts, interactive websites, and the teacher drawing graphics, to educational software demonstrating a virtual chemistry experiment.

  d. Distant learning classroom or video-conferencing, in which a teacher is broadcast live to a single or to multiple remote classrooms. The distant

rooms can communicate to the teacher and others through text or audio chatting, or video.

2. One-to-One (student and teacher communicate) Teachers monitors individual student activity and progress using a feedback program.

    a. Teacher reviews assignments, questions, has office hours

3. One-Alone (student alone with course content, self-paced) Interactive lessons, exercises, quizzes, games or other software that a student

    • E-reading devices with textbook or other reading material accesses through a computer, mobile phone, tablet or other. Applications may predict and suggest content based on student behaviour and progress.

    • Student conducted research, writing and other homework preparation on a laptop or other computer.

4. Many-to-Many (students communicate among themselves) Students communicate in a class discussion group, share information or communicate with people outside the classroom or Student group presentations.

5. Teacher Training

    a. Teachers access training materials, exercises and take tests using online or hosted material and software

    b. Teachers form a "community of practice" to share experiences, get ideas in a social media type of environment.

6. School Administration

    a. Learning management system

    b. Computer aided assessments (tests, grades).

Pedagogical frameworks describe the broad principles through which theory is applied to learning and teaching practice for an e-learning environment (Mayes and Freitas ,2004). Traditional pedagogy is different from e-pedagogy. Teachers and students should be prepared to adopt e-pedagogy at the classroom. Andresson (2010) took steps to understand phenomena of traditional and e-pedagogy and classified both pedagogies based on main learning philosophy, characteristic, key themes, technology application, learning process, emphases in the learning process, teachers' role, subject matter, location of learning and motivation (Proctor, 2002). The classifications of both are given below. Vide Table 2.2:

Table 2.2: Classification of Traditional and E-pedagogy Teaching models

Themes	Traditional model	e-learning model
Main learning philosophy	Behaviorism	Constructivism
Characteristic	The traditional educational model is mainly enacted in a classroom where the teachers and students use tools such as blackboard, books paper pens and occasionally computers. These tools make content available through description in books and through the teacher's own interpretations. The underlying norm is that the teacher is the one who should teach and that student should listen and learn. An underlying belief is that the students need teachers in order to learn and that the teacher instils the knowledge into the students, i.e. knowledge is transmitted to students. Student reproduce knowledge.	The e-learning educational model is mainly enacted through technology. Tools used are computer, learning management system, mobile phone, television and radio. Content and interaction are made available through function such as SMS, broadcasts and discussion forums. The underlying norm is that students should be highly autonomous and critical in their learning. This norm draws on an underlying belief that knowledge is created through engagement, dialogue and interactivity, ie knowledge is being constructed. Student are creating knowledge.
Key themes	Reality exists outside the learner; knowledge is objective; methods of learning are focused on how to get this reality into the students; Quality in learning is achieved through the teacher's design of	Reality is a personal interpretation constructed from experience and altered through interaction with others; knowledge is subjective; methods of learning are focused on creating a community of inquiry;

	the instruction and control of the learning environment; students are passive receivers; students' previous experience do not matter	quality in learning is achieved by interactivity, participation and dialogue; students are active, initiative-taking and self-regulating; previous learning experience of students' matter.
Technology application	ICT as a means for transmission of information; immediate responses and encouragement; self-assessment tools; examinations	ICT as a means for individual exploring; synchronous and synchronous communication; simulation; creation of learning material.
Learning process	The learning process is conducted with the whole class participating, there is almost no group or individual study	Most of the learning process takes place in groups or by the individual students
Emphases in the learning process	The student learn what and not how; the students and the teachers are busy completing the required subject matter quota; the students are not involved in inquiry based education and in solving problems, but rather in tasks set by the teacher.	The students learn how and less what; the learning includes research study which combines searching for and collecting information from web data banks and authorities on the communications network; the learning is better connected to the real world, the subject matter is richer and includes material in different formats
Teachers' role	The teacher is the authority	The teacher directs the students to the information
Subject matter	The teachers conducts the lesson according to the study program	The students participate in determining the subject matter; the studying is based on various

	and the existing curriculum	sources of information, including web, data banks and experts located by the students
Location of learning	The learning takes place within the classroom and the school	The learning takes place with no fixed location
Motivation	The students' motivation is low, and the subject matter is distant from them	The students' motivation is high due to the involvement in matters that are closer to them and to the use to technology

Source: Adapted from Andresson (2010) Proctor, (2002).

2.6 Importance of E-Learning for the Development of the Country

David (2009) found that our dominant themes emerged during the research project for the development of the country.

The first theme related to a generic notion that E-Learning is good for development, expressed with responses such as 'it provides avenues for human development', 'it bridges the digital divide', enabling participants 'to fit in the global economy' and 'to be up to date with the advanced countries'.

The second theme related more specifically to the increased educational opportunities available from e-learning, with respondents noting 'access to quality open educational resources' and 'allowing equitable access to information', which helps to 'foster information exchange and sharing' and leads to the 'promotion of 21st century skills.

The third focused on changing approaches to teaching and learning that were facilitated through e-learning, with respondents commenting that 'professors are able to invest in more innovative teaching', 'students are active in their own learning' and that it 'bridges the gap between learner and facilitator', helping to 'improve the teaching methods' and 'reducing pressure on resources'.

The fourth theme identified increased connections, access and flexibility and was demonstrated through responses highlighting the 'flexibility of hours', the opportunity to 'study whilst working' and the fact that 'learning can take place anywhere'. Alongside this was acknowledgement that e-learning serves to 'widen (the) reach of

learning opportunities' and acts as a bridge for the educational 'gap between the rural and urban areas'

2.7 Future Direction of E-learning

Where students are still studying within formal education framework, recent research trends reflect the increased mobility of the technology; from the use of small but very portable devices (Looi et al., 2011) to connected online learning, enabling students to study anytime anywhere. Previous research in TEL (E-Learning) shows that some methods ignore the learning conditions which might promote changes in cognitive structuring and therefore what kind of impact the IT environment will have on the learner. The way in which new technologies have changed the representation and codifying of knowledge, and how this process relates to the learners' mental models has shown that learners develop new ways of reasoning and hypothesizing their own and new knowledge. Therefore, measuring the effect of IT on students' learning needs to address student literacy in the IT medium as well as learning outcomes related to the aims of the curriculum. All these considerations also need to address changes taking place between the 'Present Stage' where in many cases the main concept is still based on traditional face -to -face teaching with e-learning as an enhancement or optional extra, to the 'Future Stage' in which the primary instructional mode is E-learning which may include a Face- to Face learning component as shown in Figure 2.2.
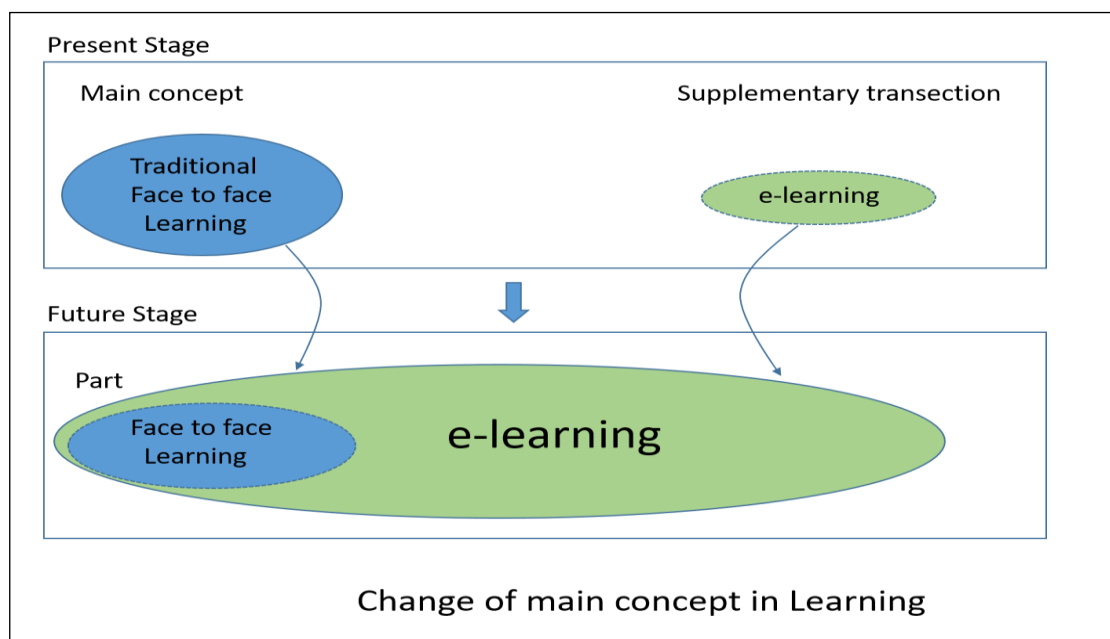
Figure 2.2: Major reversal of educational philosophy due to growth of E-learning.
Sources: (Sakamoto et al., 2011)

In this paradigm shift in education, E-learning networks of researchers are more effectively sharing knowledge, research results and practices, and overcoming cultural and national boundaries. (Sakamoto, 2002) One of the curriculum goals of e-learning in school education is to develop learners for 21st century skills through their daily learning activities (Kong et al 2014). It is foreseen that in the coming 10 years, the school education sector, throughout the world must be ready for the creation of digital classrooms which support learners to effectively develop 21st century skills through the day to day learning process.

Therefore, research practices will be intertwined with cultural differences, national priorities and global agendas (Sakamotoet al., 2011). Further Fuad et al.(,2008) summarised the integration of technology into learning and teaching progress of education. It is elaborated thus:
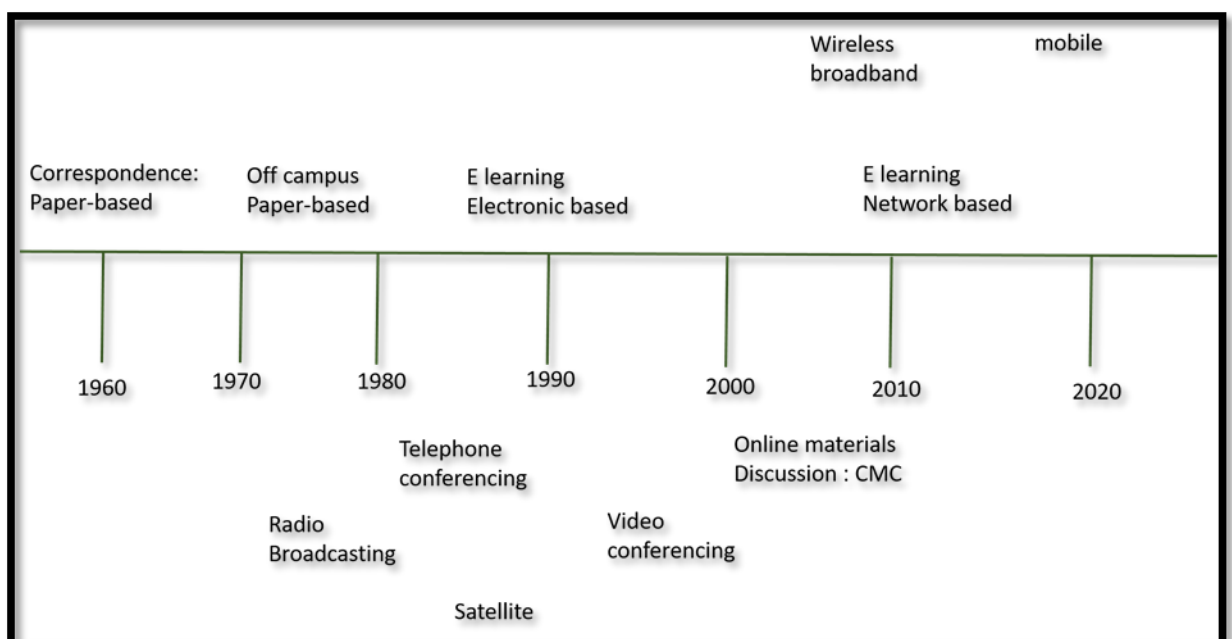
Figure 2.3: A continuum of technological integration in Education from 1960 to 2020

2.8 Theoretical Model for Implementing E-learning

There are no appropriate model for understanding e-learning implementation at the general education system in Sri Lanka, therefore the TAM model (Ahmed, 2003;

Mehra and Omidian, 2012: Kisanga, 2016) and Khan' Eight Dimensional model(Khan and Badii, 2012; Salyers, Carter, Carter, Myers, & Barrett, 2014 ; Vandenhouten, Gallagher-Lepak, Reilly, & Ralston-Berg, 2014), which were utilized for many studies to identify the factors in various countries and including Sri Lanka are selected to construct suitable model for understanding e-learning implementation at the general education system of Sri Lanka.

Technology Acceptance Model (TAM) is an information systems theory that predicts how the user comes to accept and use technology. The model (Figure 1) consists of four constructs: external variables (EV), perceived usefulness (U), perceived ease of use (EoU), and attitude (A) toward e-learning. The perceived usefulness means the degree to which a person believes that using a particular system would enhance his or her job performance, and perceived ease of use means the degree to which a person believes that using a particular system would be free from effort (Davis, 1986).
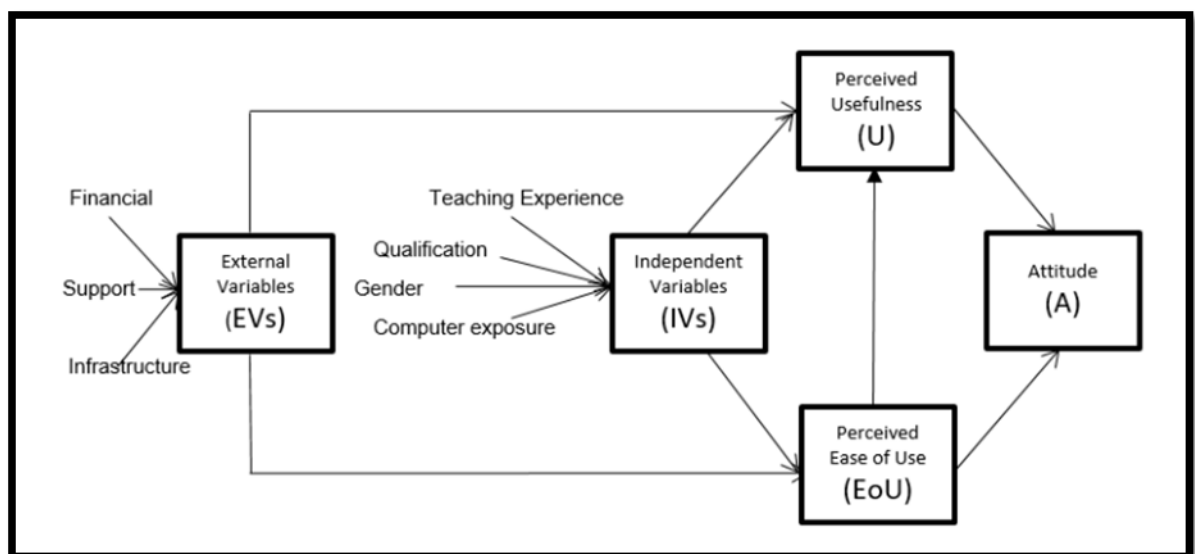
Figure 2.4: Technology Acceptance Model modified by Kisanga, 2016

Source: (Kisanga, 2016 modified from Davis, 1986)

The Khan framework is one of the most effective and comprehensive theoretical e-learning models. In fact, Khan (2010) developed an e-learning framework that encapsulates the principles of system design. The framework is represented by eight dimensions named as; pedagogical, technological, interface design, evaluation, management, institutional, resource support, and ethical shown in Table 3.1. Any e-

learning system development process has to follow a pedagogical design depictive of the entire scope of e-learning, in order to promote effective learning (Khan, 2010). The e-learning framework is a platform to enhance learner experiences only if completely embraced by higher education institutions. The dimensions provide key information regarding factors needed for promoting effective e-learning. Khan has divided his framework into three segments, the first segment is related to education, which consist of Pedagogical, Evolution and Ethical. The second segment is related to technology and interface, and the last segment is relating to managerial issues, which includes management of resource and different elements of institutions resource

Table 2.3: Eight-dimensional e-learning framework

Dimension	Focus on e-learning environment	Specific factors
Pedagogical	Teaching and learning	Analysis of content, audiences, goals, media Organizational layout of e-learning systems Design strategies, methods and approaches
Technological	Technology Infrastructure	Infrastructure planning Hardware and software
Interface Design	Aesthetic and Design	Page, site and content design Navigation, accessibility Usability testing
Evaluation	Assessment of learning and environment	Assessment of learners Evaluation of instruction Evaluation of content development processes Evaluation of learning environment Evaluation of individual involved in content development Evaluation of institutional e-learning programme
Management	Maintenance of learning environment	Managing information distribution Managing e-learning content development Managing e-learning environment
Resource support	Technical and human resource support	Online and offline resources Teaching and learning support Technical support Online support
Ethical	Social , cultural and digital	Social and political influence Cultural diversity Learner diversity, digital divide Legal issues
Institutional	Administration, academic affairs and student service	Admissions, Finances, payment Information technology service, policies Graduation and grades

Sources: Khan, (2010)

The holistic approach of Khan framework is give below figure. The model is involved from planning to evaluation status.
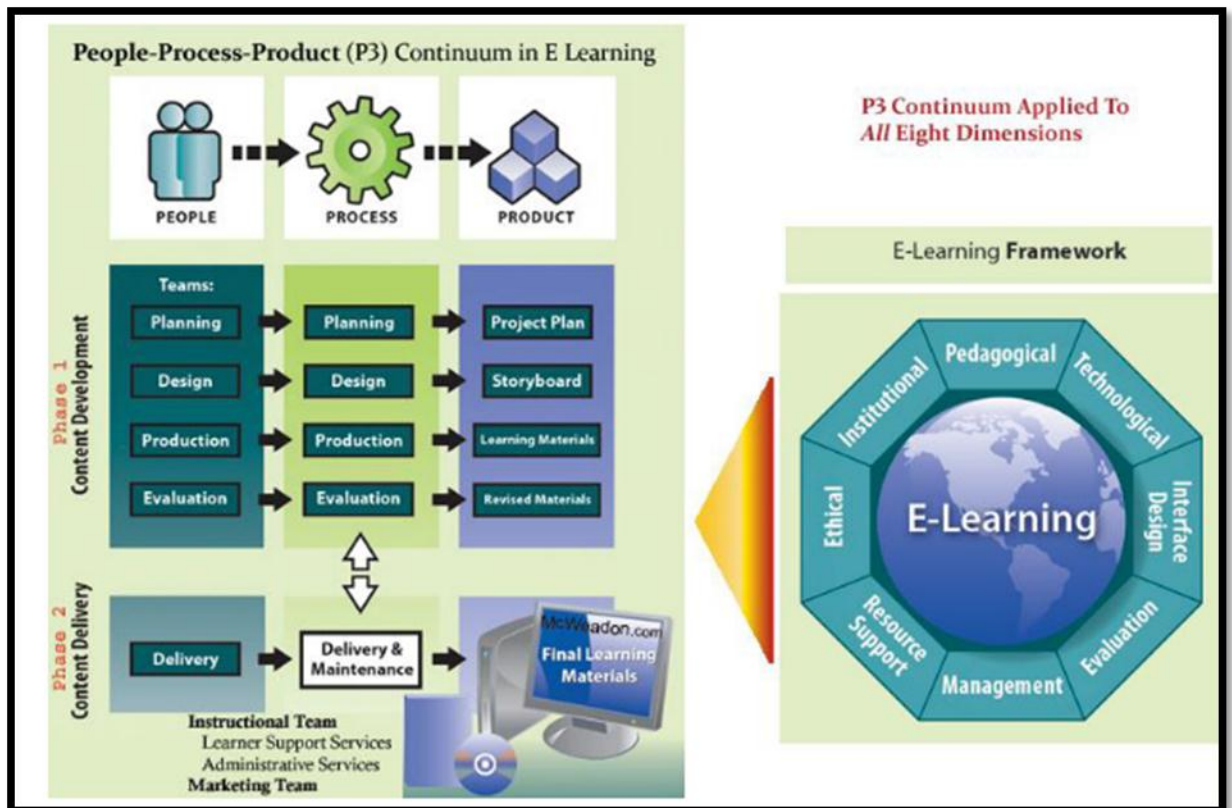
Figure 2.5: Comprehensive approach to programme evaluation in open and distributed learning

Source: Khan (2010)

These two models were applied in the developed countries scenario and particularly in Sri Lanka, these models are not employed directly to implement e-learning at schools' level in Sri Lank, Therefore, further, imperial and literature need to be sought. Anderson (2008) developed a framework to identify the factors facilitating e-learning implementation in the higher education sector in Sri Lanka. Those factors are given in the table below.

No	Dimension	Components
1	Students	Motivation, conflicting priorities (time), academic confidence, technological confidence, learning style, gender and age
2	Teachers	Technological confidence, new learning style confidence, motivation and commitment, qualification and competence and time.
3	Technology	Access, software and interface design, costs and localization
4	Course	Curriculum design, pedagogical model, subject content, teaching & learning activities, flexibility of educational resources,
5	Institution	Knowledge management, training of teachers and staff
6	Support	Support for students from faculty, social support for students, support fromm employer and support for faculty,
7	Cost	Technology, access rates, tuition course fees, books and institutional economy and funding),
8	Society	Role of teacher and student, attitudes on e-learning and IT and rules and regulations

In addition, Andersson and Grönlund (2009) proposed a conceptual framework for understanding the challenges facing e-learning implementation in developing countries and for conducting further research. This conceptual framework consists of thirty major challenges categorised under four major categories: individual characteristics (both students and teachers), technological challenges, course challenges, and contextual challenges.

No	Dimension	Components
1	Individual Challanges	Student (motivation, conflicting priorities, economy, academic confidence, technologiecal confidence, social support-support from home/employes, gender and age) Teachers (Technologial confidenance, motivation and commitment, qualification and competence and time)
2	Course Challanges	Course design (Curriculum, pedagogcal model, subject content, teaching and learning activities, localization and flexibility) Support provided (Support for students from faculty and

		support for faculty)
3	Contextual challanges	Orgnizational (knowledge management, economy and funding and training of teachers and staff) Societal/Cultural (role of teachers and student, attitudes on elearning and IT and rules and regulations)
4	Technological Challanges	Acess, cost, software and interface design and localization

Furthern Akaslan, Law and Taskin (2011) developed stages of implementation of e-learning, which has identified five stages to implement e-learning.

Stage 1: Measuring readiness for e-learning It is essential to investigate the extent of organizations" e-learning readiness. There are many factors which can have an impact on e-learning like physical components including computer and internet readiness of individuals.

Stage 2: Selecting or developing an e-learning platform. Institutions should be familiar with e-learning platforms such as Blackboard, ATutor, Moodle, Ninova and should be able to select the most appropriate.

Stage 3: Developing materials for e-learning Software tools and e-materials available : Microsoft Office, Google Documents and Wave, Facebook and MSN. E-materials, in other words content for e-learning should be developed.

Stage 4: Training individuals for the platform It is also essential to train instructors and students to implement e-learning. This should be conducted before delivering e-learning.

Stage 5: Delivering e-learning: The final stage is to deliver e-learning after infrastructure, materials and participants are ready.

In the context of schools in Sri Lanka, e-learning is implement e in two stages: measuring the readiness of schools and delivering e-learning at schools. Therefore these two stage are very important. In the context of government schools, delivering e-learning, plays an important part since there are many of internal and external factors influencing the implementation of e-learning at schools. The next part of this chapter will discuss issues and factors.

2.9 E-learning Implementation issues and Factors

The TAM and Khan models were advanced in developed countries and they mainly focused on the higher education sector, therefore, a suitable framework needs to be developed for exposing the factors influencing on the usage of e-learning at school level. From time to time, researchers Andresson, (2010); Gamage, Fernando and Perera, (2014); Nawaz, Thowfeel & Rashida, (2015); Suraweera, 2015) conducted studies to identify the facilitating factor in e-learning in Sri Lanka. Gamage, Fernando and Perera (2014) identified the key dimensions affecting effectiveness of e-learning such as interactivity, collaboration, motivation, network of opportunities/ director for future, pedagogy, content/material, assessment, usability, technology and support for learners. Further, Andresson (2010) identified the major challenges faced by developing countries with a case study of Sri Lanka. The study included informants with data collected from year 2004 to 2007, covering views of students and staff. The main factors identified are students support, flexibility, teaching and learning activities, access, academic confidence, localization and attitude. The teachers play an important role on implementing e-learning based on the study done by (Nawaz, Thowfeel & Rashida, 2015). Nawaz et al (2015), discovered that perceived usefulness, perceived ease of use, social influence attitude towards use and facilitating condition are determinants of behavioural intentions to be used by teachers in schools. The existing models are summarized in the Table 2.4.

Table 2.4: Summary of factors from existing models

Authors	Dimension
Lahwal, Ajlan & Amain (2016).	Internal dimension (prior educational and knowledge, skill and experience and, characteristic of the student and ability), Pedagogical and external dimension (technology supported learning, physical, economic implication, culture setting and social)
Kisanga (2016).	External Variables (Financial support, Infrastructure), Teaching (qualification, gender and computer exposure), Perceived ease of use, Attitude, Perceived usefulness
Faruque, Haolader, Muhammad (2013).	Teachers' attitudes, ICT competence, Computer self-efficacy, Gender, Teaching experience, Education level, Professional development, Accessibility, Technical support, Leadership support, Pressure to use technology, Government policy on ICT literacy, Technological characteristics,
Khan (2005).	Pedagogical, Technological, Interface design, Evaluation, Management, Resource support, Ethical and Institutional

Aguti, Walters & Wills (2010).	e-learning course delivery strategies, e-learning readiness, Quality e-learning systems and effective blended e-learning
Ali, Uppal & Gulliver, (2018).	Pedagogical, Individual, Technology and Enabling condition
Andoh (2012).	Personal characteristics, Teachers' attitudes, ICT competence, Computer self-efficacy, Gender, Teaching experience, Teacher workload, Institutional characteristics, Professional development, Accessibility, Technical support, Leadership support, Technological characteristics,
Mehra & Omidian(2012)	Perceived usefulness, Intention to adopt e-learning, Ease of e-learning use, Technical and pedagogical support, e-learning stressor, Pressure to use e-learning
Ouma, Awuor & Kyambo (2013)	Teachers technical competency, Teachers attitude and perception, Students technical competency, Students' attitude and perception
Vandenhouten et al (2014)	Pedagogy, Technology, Evaluation, Management, Resource support, Ethic, Institutional, Interface design
Raspopovic et al (2014)	Information quality, System quality, Service quality, User satisfaction, Intention to use
Brooking, (2012).	Shared vision and policies aligned to social and economic desired impacts, 21st century Pedagogy requirements, Foundational ICT skills , Curriculum framework , Contingency Planning , Skilled Personnel and continued professional development, Suitable equipment, Technical Support, Assessment and Evaluation

Authors	Dimension
Aguti, (2015).	Course content (course modules; outline, prior knowledge, understandable, progress level, learning outcomes and sequentially organized), course evaluation (course module; alignment, requirements, periodic updates, resources, expectations, difficulty), students assessment(randomised online assessments, knowledge of assessment criteria, constructive feedback and grading policy), course planning (student learning needs analysis, course resource analysis, instructional strategies, course module learning materials, student enjoyment and learning media analysis), e-learning (university vision to integrate e-learning, ICT policies on e-learning staff representative, staff mentoring on e-learning use and e-learning special fund) e-learning culture (beliefs about the value of e-learning, attitudes toward e-learning academic achievement with e-learning, societal norms on e-learning) e-learning instrastructure (access to computing technologies, tools for course module development, up to date system platform for course module delivery, lecture recording capture system) e-learning cost (cost of development of course module material, implementing e-learning platforms, cost of technical and e-learning support) e-learning support(e-learning induction training, course module development

	support, on demand support, staff capacity development on use of e-learning, e-learning staff webinars and ICT training support), quality learning management systems (adaptability of course module platform, ease of navigation, consistency of course platform, user-friendliness, multi-culturally appealing, accessibility of course content, event management, user management, security of user data and collaborative learning)
Masoumi, & Lindström, (2012).	Institutional factor (institutional affairs, administrative affairs, research and reputation), instructional design factors (clarifying expectations, personalization, selecting proper learning scenarious, organizing learning resources and currency and accuracy of learning resources), evaluation factors (cost-effectiveness, learning effectiveness, students satisfaction, teachers satisfaction), technological factor (development and sustainability of technological infrastructure, functionality of technological platforms, accessibility, interface design), pedagogical factor (student centredness, communication and interactivity, social aspect, learning environment, assessment and learning resource), student support (administrative support and technical support), faculty support (technical assistance in course development, administrative support and pedagogical support)

Authors	Dimension
Miranda, Isaias, Costa, & Pifano, (2017).	Technology (access, mobility, visualisation, web 3.0, interoperability and personalisation), Content (semantics, annotation homogeneity and flexibility and storage), stakeholders (students, teachers and educational institution)
Basak, Wotto, & Bélanger, (2016).	Resource factors, institutional factors, ethical factors, evaluation factors, social interaction factors, management factors, pedagogical factors and technological factors
Bhuasiri, Xaymoungkhoun, Zo Jeung, & Ciganek, (2012).	Learners' characteristics (computer self-efficacy, internet self-efficacy, attitude toward e learning), instructors' characteristics (timely response, self-efficacy, technology control, focus on interaction, attitude toward students and interaction fairness), institution and service quality (computer training and programme flexibility), infrastructure and system quality (internet access quality reliability, ease of use, system functionality system interactivity and system response), course and information quality (course quality relevant content and course flexibility), extrinsic motivation (perceived usefulness and clear direction)
Sun, Finger, & Liu, (2014).	Person (learners, teachers, community and schools), information system, ICT, pedagogy (learning model and content design)
Gunawardana, (2005)	Instructional material, Tutorial support, communication and collaboration
Pathiratne, (2014)	Teachers technical competency, teachers' attitude and perception, student's technical competency and students' attitude and perception

Thowfeek, & Hussin, (2008)	(i) Instructors' readiness, which include awareness, training and confidence; (ii) Students' readiness, which also include awareness, training and confidence; (iii) the need for e-learning, that is, the type of program or courses suitable for this mode; (iv) Infrastructure; (v) institutional support; (vi) motivation and incentives; and (vi) the E-learning system itself
Kanaganayagam, & Fernando, (2013).	Technology (HW support, SW support, media & model of delivery), Pedagogy (student interaction with faculty/ tutors/ student, learning pace, methodology followed by lecturers), motivation (attention, relevance, confidence, satisfaction), usability (interface design, learning environment, navigation, feedback), content/learners(relevancy, updated and rich collaborative information), support for learners (psychological and social support for students, administrative support and student complaints procedure), assessment (collaboration assessment, periodical, evaluation of student satisfaction levels, regular review of student achievement), future direction (recognized by the industry , direct to opportunities, expose to other networks), collaboration (with learners, instructs, faculty) interactivity (with peers, material/ content and instructor)

Authors	Dimension
Suraweera, Liew, & Cranefield, (2011).	Organizational factor (extent of change agent's promotion, efforts & resource), Educational factors (education, subject domain, pedagogy, government system and higher education governance), Technological factors (relative advantage, compatibility, complexity and trialability), Individual factors performance expectancy, effort expectancy, social influence, facilitating conditions, learning needs, readiness and relevance), Cultural factors (power distance, individualism and collectivism and long term orientation) Social factor (nature of social systems)

There are a number of factors to be considered when it comes to introducing e-learning in a developing country like Sri Lanka. Sri Lanka has its own unique social and cultural contexts that may considerably affect the adoption and use of e-learning. In the Sri Lankan Higher Education Sector, Suraweera, (2015) categorized factors and issues into four categories: organizational issues, technological issues, pedagogical issues, and social and cultural issues. The literature has highlighted many factors of e-learning that are related to developed countries. Most of the developed countries schools' develop their e-learning content and implement them in schools, but in the Sri Lankan education system, its is so different and schools are too young to prepare e-learning material on their own. The factors and issues are also so

different from developed countries. Based on the literature review and the existing model from 2005 to 2018, factors are categorised into six main factors: pedagogy, people, policy, technology, institute and resources. These factors are considered important factors to implement e-learning at schools in Sri Lanka. These factors are briefly discussed here .

2.9.1 Policy

Government strategy on ICT literacy Policy and planning are important in identifying the aims of using ICT in education and in determining priorities in allocating resources (Pernia, 2008). Porcaro, (2011) highlighted that the national context and policies influence innovation. Therefore, the government policies and general education policies can be an important component for e-learning implementation at schools. In the Sri Lankan education setting, the Ministry of Education develops its own policies and strategies based on government policies and strategies (National Education Commission, 1996), and the National Education Commission makes recommendations to the president about these policies with a view to ensuring continuity in educational policy and enabling the education system to respond to changing needs in society in Sri Lanka (National Education Commission Act, No. 19 of 1991, 1991) .

2.9.2 Resources

Resources are very important for implementing e-learning at school- level. Lack of infrastructure, technical infrastructure or inadequate resources such as finance and equipment in the organization can be main obstacles in the use of e-learning. In the Sri Lankan context, lack of IT infrastructure is one of the problems faced by schools. This will enable one to understand how resources impact on the use of e-learning at schools in Sri Lanka.(Suraweera, Liew, & Cranefield, 2011).

2.9.3 Pedagogy

Many researchers underlined pedagogical factors that affect the successful implementation of e-learning (Basak, Wotto, Belanger, 2016). The training of teachers in the pedagogical issues should be increased if teachers are to be convinced of the value of using ICT in their teaching-learning process, (Ali, Haolade and

Muhammad, 2013). Pedagogy as well as technology must be changed when moving to the e-learning environment. (Vandenhouten, Gallagher-Lepak, Reilly, & Ralston-Berg, 2014).

E-Learning is not just a technological add-on that teachers need to learn how to use; it is a new educational approach involving new pedagogical and professional procedures and processes that require support and professional development beyond conventional teaching forms (Marshall 2006). In the same vein, teachers' pedagogical knowledge and qualifications along with their specific subject knowledge, could be imperative for their success in e-learning environments. Moreover, psychological, social, and cultural issues and skills may also affect teachers' pedagogical approaches and therefore introducing constructivist e-learning is not an easy task for developing countries like Sri Lanka.

2.9.4 Institute

Education authorities and the centres for which they are responsible have key tasks related to enabling, implementing and monitoring the use of ICT for learning and teaching (Pernia, 2008). It is necessary to convince the institution that it has to support e-learning , that it needs to encourage its teachers, that it needs to bring people who are experts in this area to work with teachers and students(Salyers, Carter, Carter, Myers, & Barrett, 2014). The institutional dimension includes administrative affairs (e.g., needs/readiness assessment, budgeting and return-on-investment, partnerships with other institutions, marketing and recruitment, admissions, financial aid), academic affairs (e.g., accreditation, instructional quality, faculty and staff support workload, compensation) and student services (pre-enrollment services, advising, services for students with disabilities, library support) (Khan, 2005). Many researchers indicated how management factors affect the implementation of e-learning. These are the management team, managing content development, manging delivery, lack of expertise, limited support, time management efficiency and effectiveness (Basak, Wotto, Belanger, 2016). The Sri Lankan government controls all areas of the political and economic system in the country, including education. Hence, the government is the lead organization for implementing general education in Sri Lanka.

2.9.5 Technology:

Many studies have focused on technology as a means of enhancing learning. Importantly, the major driving force of the historical trends identified were technologies. Researchers currently focus on Technological Pedagogical Content Knowledge (TPACK) needed for effective current and future e-learning. (Sun, Finger & Liu, 2014). The technological factor addresses technical infrastructures and assets that form the backbone of an e-learning entity. The technological infrastructure is viewed as the ensemble or 'web' of equipment, techniques, and applications whose efficiency can be characterized in terms of availability and reliability, the adequate functionalities, usability, and integration into the existing infrastructure. Such technological infrastructure is one of the most dynamic and rapidly changing features of e-learning environments that needs to be systematically improved and updated on a regular basis. It should be noted that technological infrastructure includes the learning management system (LMS), learning content management systems (LCMS), and authoring tools, although it is not restricted to these issues (Msoumi & Lindstron, (2012).

2.9.6 People:

The 'person' is considered to be an important dimension in educational computing research. It was categorized into three levels, namely, ???? individual, which includes student and teacher; community; and organization (school) (Vandenhouten, Gallagher-Lepak, Reilly, & Ralston-Berg, 2014). When compared to the traditional classroom, E- Learning requires the talents of many team members from a variety of departments as well as the use of different teaching and learning strategies. Pedagogy as well as team configurations must change when moving to the online environment. (Vandenhouten, Gallagher-Lepak, Reilly, & Ralston-Berg, 2014). According to researchers, individuals and teams can affect the use of e-learning. Individuals' perception is an important factor for accepting e-learning. Mehra and Omidian (2012) found that students' attitudes had a vital impact on e-learning. Attitude is defined as an individual's positive or negative feelings (evaluative effect) about performing the target behaviour (Mehra & Omidian, 2012). Kisanga, (2016) found that teachers have positive attitudes towards e-learning where computer exposure played a statistically significant contribution to their attitudes. It is recommended that training in e-learning

needs to be provided to teachers to widen their understanding of e-learning. There is also a need to strengthen factors associated with teachers' positive attitudes towards e-learning.

For successful integration of e-learning into teaching-learning process, it can be concluded that the factors that positively influenced teachers' and administrators' use of ICT in education include teachers" attitudes, ICT competence, computer self-efficacy, teaching experience, education level, professional development, accessibility, technical support, leadership support, pressure to use technology, government policy on ICT literacy, and technological characteristics. However, the presence of all factors increases the probability of excellent integration of e-learning in the teaching-learning process (Ali, Haolade and Muhammad, 2013). Further, factors from extended literature reviews and theoretical models are summarised here based on six factors.

Table 2.5: Critical success factors in the use of e-learning

No	Dimensions	Reference
	Policy • Rules and Regulations • Shared Vision and Policies aligned to social and economic desired impacts, • Government policy on ICT Literacy • ICT policies on e-learning staff representative • Long -term orientation	*Khan (2010); Faruque, Haolader, Muhammad (2013); Brooking, (2012); Aguti, (2015); Suraweera, Liew, & Cranefield, (2011).*

	People
	• Student
	   o
	       otivation, (extrinsic motivation) perceived usefulness and clear direction)) conflicting priorities (time), academic confidence, technological confidence, learning style, gender and age
	   o
	       ocial support- home
		Andersson (2008); Andersson and Grönlund (2009); Lahwal, Ajlan & Amain (2016) Kisanga (2016); Faruque, Haolader, Muhammad (2013); Ali, Uppal & Gulliver, (2018); Andoh (2012); Mehra & Omidian(2012); Ouma, Awuor &Kyambo (2013);

○
      rior educational and knowledge, Skill and experience and Characteristic of the student and ability
    ○
      ttitude
    ○
      erception
    ○
      tudent learning needs analysis
 	
  • **Teachers**
    ○
      echnological confidence, new learning style confidence, motivation and commitment, qualification and competence and time
    ○
      rior educational and knowledge, Skill and experience and
    ○
      omputer exposure
    ○
      ttitude
    ○
      rofessional development
    ○
      eacher workload,
    ○
      -learning stressor
    ○
      eachers technical competency
  • Society
    ○
      ttitudes on e-learning and IT
    ○
      Skilled Personnel
	Brooking, (2012); Aguti, . (2015); Miranda, , Isaias , Costa, & Pifano, (2017); Bhuasiri, Xaymoungkhoun, , Zo, Jeung, & Ciganek, (2012); Sun, Finger & Liu, (2014); Pathiratne, (2014) Thowfeek, & Hussin, (2008) ;Kanaganayagam, & Fernando, (2013); Suraweera, Liew, & Cranefield, (2011).

Pedagogy
 	
  • Teaching & Learning
 	
    ○
      ontent, goal, media, e-learning system, methods & approaches
 	
  • Curriculum design
 	
    ○
	Khan, (2010); Andersson (2008); Andersson and Grönlund (2009); Aguti, Walters & Wills (2010); Ali, Uppal & Gulliver, (2018); Vandenhouten et al (2014); Brooking, (2012); Masoumi, & Lindström,(2012); Miranda, , Isaias, , Costa, ,

		lexibility of educational resources	& Pifano, (2017); Basak, Wotto ,& Bélanger, (2016); Kanaganayagam, & Fernando, (2013); Suraweera, Liew, & Cranefield, (2011)
		○ urriculum	
		○ urriculum Framework	
		• Subject content	
		• Pedagogical model	
		• Support provided	
		• Quality e-learning systems	
		• Grading policy	
		• Student centredness, communication and interactivity, social aspect, learning environment, assessment and learning resource	
		• Assessment (collaboration assessment, periodical, evaluation of student satisfaction levels, regular review of student achievement),	
	Resource		Khan, (2010). Andersson (2008) Andersson and Grönlund (2009) Lahwal, Ajlan & Amain (2016) Kisanga (2016) Vandenhouten et al (2014) Brooking, (2012). Aguti, (2015). Masoumi, & Lindström, (2012). Basak, , Wotto, & Bélanger, (2016). Bhuasiri, Xaymoungkhoun, , Zo, Jeung, , & Ciganek, (2012). Kanaganayagam, & Fernando, (2013). Suraweera, Liew, & Cranefield, (2011).
	• HR support		
		○ echnical support	
		○ eaching and learning support	
	• Economy and funding		
	• Physical, economic implication,		
	• Infrastructure		
	• Resource support		
	• Suitable equipment,		
	• Course and information quality (course quality, relevant content and course flexibility)		

	• Content/learners(relevancy, updated and rich collaborative information),	

	Technology
	
	• Technology
	
	    o ardware & software
	
	    o ccess
	
	    o ocalization
	
	• Support for students from faculty
	
	    o echnology supported learning
	
	    o uality learning management systems
	
	• Sustainability of technological infrastructure
	
	• Infrastructure and system quality (internet access quality reliability, ease of use, system functionality system interactivity and system response),
		Khan, (2010); Andersson (2008); Andersson and Grönlund (2009); Lahwal, Ajlan & Amain (2016); Faruque, Haolader, Muhammad (2013); Ali, Uppal & Gulliver (2018); Andoh (2012); Mehra & Omidian (2012); Vandenhouten et al (2014); Aguti, (2015); Masoumi, & Lindström, (2012); Miranda, Isaias, , Costa, & Pifano (2017); Basak, Wotto & Bélanger, (2016); Bhuasiri, Xaymoungkhoun, Zo, Jeung, , & Ciganek, (2012); Sun, Finger, & Liu, (2014); Thowfeek, & Hussin, (2008); Kanaganayagam, & Fernando, (2013); Suraweera, Liew, & Cranefield, (2011)

	Institute/Organizations
	
	• Management
	
	    o -learning content
	
	    o -learning environment
	
	• Administration
	
	• Training of teachers and staff
	
	• Support from employer
	
	• Leadership support
		Khan, (2010); Andersson (2008); Andersson and Grönlund (2009); Faruque, Haolader, Muhammad (2013); Ali, Uppal & Gulliver, (2018); Andoh (2012); Mehra & Omidian(2012); Vandenhouten et al (2014); Brooking, (2012); Masoumi, & Lindström, (2012); Basak, Wotto, , & Bélanger, (2016); Bhuasiri, Xaymoungkhoun, Zo, ,

	• Pressure to use technology • Enabling condition • Institutional characteristics • Intention to adopt e-learning • Contingency Planning • Institution and service quality • Support for learners (psychological and social support for students, administrative support and student complaints procedure) • Future direction (recognize , the industry, direct to opportunities, expose to other networks), collaboration • Educational factors (education, subject domain, pedagogy, government system and higher education governance)	*Jeung, , & Ciganek, (2012); Thowfeek, & Hussin, (2008); Kanaganayagam, & Fernando, (2013); Suraweera, Liew, & Cranefield, (2011)*

2.10 Empirical Studies in Sri Lanka

Gunawardana, (2005) conducted research on potential challenges and benefits of implementing e-learning in Sri Lanka by reviewing the awareness and readiness of the selected higher educational institutes. Findings revealed that awareness of e-learning among the educational institutes is very high but investment to develop an e-learning application is very poor. Most of the institutes created e-learning programmes but they did not use them. Thowfeek and Hussin, (2008) studied the perception and views of the lecturers at South Eastern University (SEUSL). The study indicates that lecturers were with positive attitude and supportive mind- set to embark on the e-learning initiative.

Premarathne et al, (2016) investigated effectiveness of e-learning on the Z- score of A/L students in Sri Lanka. The research was carried out among 50 first year undergraduate students from the mathematics, biology and commerce stream of the Sir John Kotelawala Defence University. The variables are number of hours e-

learning facilities used by students per week, the numbers of private tuition hours per week and the number of self-learning hours other than e-learning per week. The findings revealed that e-learning facilities used per week has a strong significant impact for Z-score of the students than the number of private tuition hours per week and the numbers of self-learning hours other than e-learning per week. Since this study sample is very small, it is thus difficult to generalise the findings. In the general educational context of, e-learning implementation at school level, there are two key stakeholders such as students and teachers. The above study indicates that e-learning indeed has great impact student performance. This reveals the importance of e-learning in school of Sri Lanka.

Nawaz et al (2015) attempted to comprehend the school teachers' intention to use e-learning systems by using TAP model for teachers in Eastern Province of Sri Lanka. The sample method was conveniently utilised for 500 teachers. Self-administrative questionnaires were distributed and data collected. The finding emphasizes that teachers in Sri Lanka should be made awareness of the usefulness utilizing e-learning systems. Further, the findings indicate that perceived usefulness, perceived ease of use social influence attitude towards use and facilitating condition are positively and significantly influencing the behavioural intention.. The facilitating condition plays a vital role in implement e-learning. This study was somewhat limited since the geographical scope was confined to the Eastern province of Sri Lanka and selection of respondents was based on convenience which made the responses biased to a particular region of the country and therefore the extending of this study to the whole Sri Lankan needs to be done with circumspection. Further, this research considered only teachers. If the student population was also included in this study, it would have been more comprehensive.

2.11 Readiness of Implementing E-Learning

Prior to even considering e-learning solutions or tools, it is imperative to assess and address the factors that can cause failures in education. Success in e-learning comes about by understanding the needs as well as the readiness of major players in the e-learning environment (Mercado, 2008). Futher, Ouma, Awuor and Kyambo (2013) suggested that success in e-learning can be achieved by understanding the level of

readiness of e-learning at school. Therefore, it is important to evaluate e-learning readiness before the adoption and implementation of e-learning to be successful (Coopasami, Knight, & Pete, 2017). E-Learning readiness is important to achieve if effective e-learning programmes are to be accomplished (Kaur & Zoraini Wati, 2004). Readiness is defined as being "prepared mentally or physically for some experience or action" (So & Swatman, 2006). E-Learning readiness determines whether an institution and its students are psychologically and technically prepared and have the equipment to implement e-learning (Borotis & Poulymenakou, 2004).

Chapnick (2000) developed a model which consists of dividing different groups into eight readiness factors. They are Psychological readiness, Sociological readiness, Environmental readiness, Human resource readiness, Financial readiness, Technological skill readiness, Equipment readiness and Content readiness. They are defined as follows:

-**Psychological readiness**- focuses on an individual's state of mind as this impact on the outcome of the e- learning initiative. This type of readiness is regarded as being among the most significant aspects that could affect the implementation process.

Sociological readiness- recognizes the characteristics of the environment in which the programme will be conducted.

Environmental readiness - considers the forces affecting stakeholders both inside and outside the organization.

Human resource readiness reflects on the accessibility and plan of the human support system.

Financial readiness - relates to the financial resources available in terms of budget size. **Technological skill readiness** - refers to the availability of technical support. **Equipment readiness** -deals with the ownership and availability of proper and appropriate equipment.

Content readiness- focuses on the substance of the curriculum being developed for teaching. Further, Parlakkılıç (2015) grouped into eight dimensions based on previous researches. The dimensions are as follows:

Technological skills readiness - refers to the observable and measurable technical competencies involving users' capabilities with computers and the Internet.

Online learning style readiness - It is defined as the readiness of the learner or trainee in terms of time commitment to e-learning, discipline and interest in e-learning and the perception of the status of qualifications obtained via e-learning. **Equipment/infrastructure readiness** -This dimension is defined as the right equipment/infrastructure readiness, provision of technical support, e-learning content delivery, and a LMS adopted by the organizations.

Attitude readiness- User attitudes are factors that influence the use of technology. Attitude readiness in this study involves confidence, enjoyment, importance, motivation, self-development, and anxiety.

Human resources readiness- It is the availability and design of the human support system.

Environmental readiness- It involves the readiness of the institution as a whole in terms of government policy, the role of mass media, and intellectual property regulations. **Cultural readiness:** It is the use of e-learning in terms of internet use and networked technologies to disseminate information, communication, interaction and teaching. **Financial readiness-**This concept refers to whether a learner/trainee or an institution is financially ready for e-learning programs. the most important models for assessing e-learning readiness are given below table 2.6.

Table 2.6: Summary of models for assessing e-learning readiness

E-learning Readiness Model	E-Learning Readiness Factors
Champick's Model (2000)	Psychological, Sociological, Environmental, Human resources, Financial readiness, Technological skill (aptitude), Equipment and Content readiness
Aydin & Tasci, (2005)	Technology, Innovation, People, Self- Development

Pathiratne, (2014)	ICT Infrastructure, Edifiers and the student's computer literacy level and competence, School management support, Current content format and Student edifiers postures and perceptions towards e-learning.
Psycharis's Criteria for readiness (200)	Resources (Technological readiness, Economic readiness, Human resources readiness- participants in e-learning), Education (Readiness of content, Educational readiness) Environment (Entrepreneual readiness, Leadership readiness and Readiness of culture (of organizational and staff)
Ahmad, Quadri, Qureshi, & Alam, (2018)	Network security, Efficient technology infrastructure, Organizational infrastructure readiness, User-friendly and well organized, Appropriate e-learning course design, Stakeholders training, course flexibility, Understandable relevant content, Course flexibility, Stakeholders training, Commitment, Computer competency (ICT skill), Interaction with other students, Motivation, Easy language communication, Appropriate System for enhancing sustainability and performance in e-learning

Source: (Psycharis, 2005; Okinda, 2014; Pathiratne, 2014)

In addition to these modes, Akaslan & Law, (2010) developed a framework for assessing the e-learning at schools. The framework is given below figure 2.6.
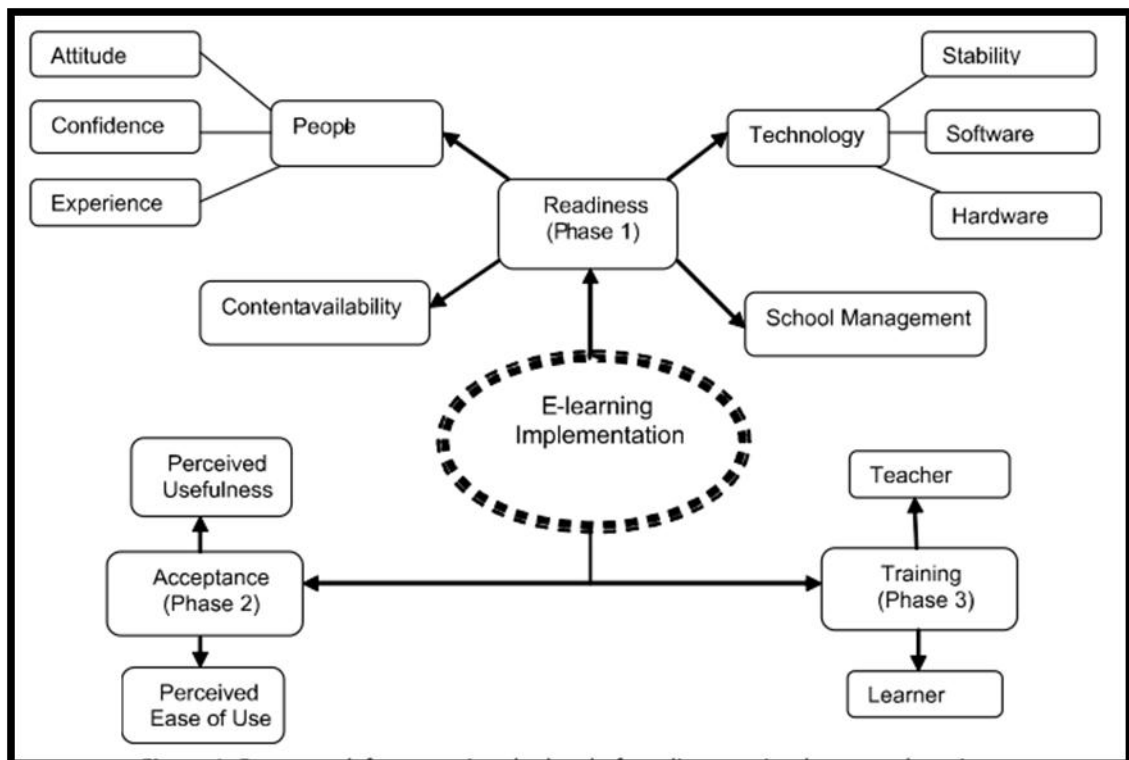
Figure 2.6: Framework for assessing the level of readiness to implement e-learning

Sources: Akaslan & Law, (2010)

After analysis of the extant literature, studies show that there are numerous models that have been developed, however, they are used in developed counties whose e-readiness is rather high, hence not applicable in developing countries (Oketch, Njihia, & Wausi, 2014) and the most of them were applied in higher education sectors. Therefore, it is of vital importance to develop appropriate models with suitable components to assess e-learning readiness at schools in Sri Lanka. The components for assessing e-learning are classified into six components: policy, people, pedagogy, technology, resources and institutes.

Table 2.7: Components for assessing e-learning at school

No	Components	Referrences
	Policy • Educational readiness	*Psycharis (2000)*
	People • Attitude • Confidence • Experience • Computer competency (ICT skill) • Edifiers and students' computer literacy	Akaslan & Law, (2010) Ahmad, Quadri, Qureshi, & Alam, (2018) Pathiratne, (2014) Engholm (2001).

	level and competence • Perceptions towards e-learning	
	Pedagogy • Appropriate e-learning course design, • Readiness of content • Current content format	Ahmad, Quadri, Qureshi, & Alam, (2018) Pathiratne, (2014) Psycharis's Criteria for readiness (2000)
	Technology • Hardware • Software • ICT Infrastructure	Psycharis (2000) Pathiratne, (2014) Pathiratne, (2014) Champick's Model (2000).
	Resources • Efficient technology infrastructure • Stakeholders training • Human resources readiness-participants in e-learning • Economic readiness, • Financial readiness	Ahmad, Quadri, Qureshi, & Alam, (2018) Champick's Model (2000).
	Institutes • School management • Organizational infrastructure readiness • Leadership readiness • School management support	Akaslan & Law, (2010) Psycharis's (200) Pathiratne, (2014) Engholm (2001).

In the e-learning era, a few researches were undertaken from the developing countries' perspective in the higher education sector (Aydin & Tasci, 2005; Oketch, Njihia, & Wausi, 2014; Ahmad, Quadri, Qureshi, & Alam, 2018), while in the school perspective very few studies (Akaslan & Law, 2010; Pathiratne, 2014) were done. In order to benefit from e-learning, institutions should conduct considerable up-front analysis to assess their e-learning readiness, according to a study were conducted in Kenya in University of Nairobi. This mainly focused on the fact that e-learning readiness from the perception of lecturer. The finding revealed that technological readiness was the important factor followed by culture factors. However, age, gender, educational level had no significant role on e-learning readiness. Further, the study revealed that although the lecturer showed interest on content development training and the ICT infrastructure, it was not sufficient for implementing e-learning (Oketch, Njihia, & Wausi, 2014). Further, another study in the context of schools, teachers and students' attitude and perception and computer literacy are significant measures for assessing e-learning implementation (Ouma, Awuor, & Kyambo, 2013).

Especially in regard to the context of Sri Lankan schools, Pathiratne (2014), conducted an investigation in ten Central Colleges within Kegalle and Gampaha District in Sri Lanka. The survey examined the calibre of technical competency and computer literacy among edifiers and student, their posture and perception towards the utilization of e-learning. The findings revealed that edifiers and students are yearning to embrace e-learning technology, but it is imperative to enhance their technical capacity through training for successful e-learning. Although most students accept e-learning, they lack rudimental computer skills required of them to efficiently utilise the e-learning platform. The study revealed a positive correlation between computer literacy and the e-learning acceptance.

2.12 Literature and Theoretical gaps for Implementing E-learning at Schools in Sri Lanka

Sri Lanka maintains high educational standards as compared to the rest of Asia (Gamage and Halpin, 2006). However, when we look at research publications pertaining to the local context, it is quite clear that even though there exists a potential for e-learning , it is not implemented on a broad scale. Most of the studies found in developing countries focused on the higher education institutes and universities (Ahmed, 2003; Andersson et al, 2009; Mehra et al, 2010; Omidian, 2012; Masoumi, et al, 2012; Kisanga, 2016; Khan et al, 2012; Salyers et al, 2014; Raspopovic et al , 2014; Lahwal et al, 2016; Kisanga, 2016; Miranda et al, 2017; Ali et al, 2018). Specifically, a few reserchers (Gunawardana, 2005; Suraweera et al 2011; Kanaganayagam, et al, 2013); Premarathne et al, 2016) conducted research on e-learning in the higher education sector. E-Learning implemention and factors at schools' level was carried out a few research projects (Ouma et al, 2013; Sun, Finger, 2014).

Specific and relevant research (Pathiratne, 2014; Nawaz et al 2015) were found in literature and theoretical reviews. This indicates that e-learning at school sector is at very nascent stage, therefore, the study focused on the facilitating factors for implementing e-learning at schools level and developing new theoretical framework named as the E-**School Framework.** Further it covers all stakeholders such as

students, teachers, principals and educational professionals in Sri Lanka, which would also be a cross section of geographic locations of Sri Lanka.

2.13 Conceptualized Framework for Implementing E-learning in General Education Systems

The conceptual model is presented as a framework to guide the process of data collection and analysis in this study, to enable understanding of factors affecting the introduction of e-learning in general education system in Sri Lanka

Figure 2.7 illustrates a conceptual model of this study. It was developed by combining insights from the literature review and theoretical review.
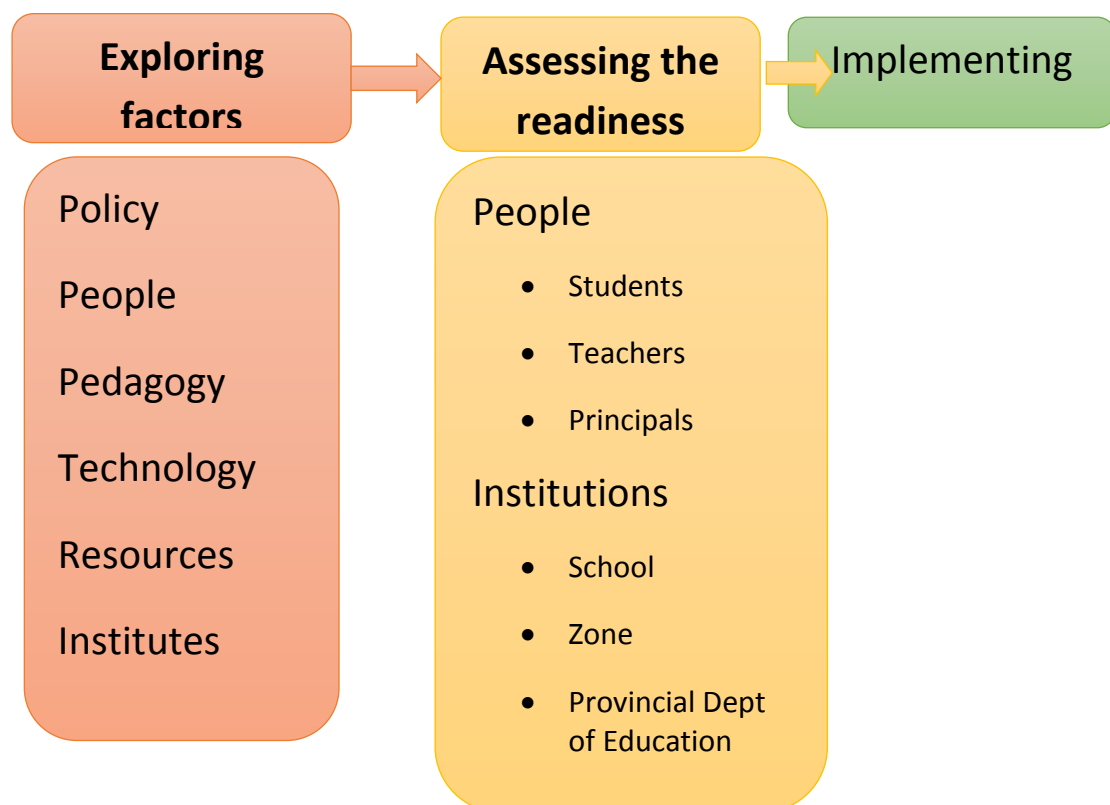
Figure 2.7: Conceptualization framework for implementing e-learning at schools

Source: Developed by researchers

CHAPTER 03 :
RESEARCH METHOD

3.1 Introduction

This chapter outlines the research design and methodology used in carrying out the current study. First, it provides the selection of the research method. and then outlines the research design, with special emphasis to the analysis of data.

3.2 Selection of Research Method

The Mixed Method employed for purposes of this study is a combination of both the qualitative and quantitative methods. The *Quantitative Method* is predominantly used as a synonym for any data collection technique or data analysis procedure that generates or uses numerical data. In contrast, the *Qualitative method* is used predominantly as a synonym for any data collection technique or data analysis procedure that generates or uses of non-numerical data. The *Mixed method* is an approach which has become a third paradigm for social research. It has developed a platform of ideas and practices that are credible and distinctive and that marked the approach, as a viable alternative to the quantitative and qualitative paradigms. The reasons why the Mixed method is used for research is seen by reviewing many studies, where some researchers use Mixed Methods to improve accuracy of data, other use it to produce a more complete picture by combining information from complementary kinds of data or sources. The Mixed Method is used as means of avoiding the biases intrinsic to single-methods approaches- as a way of compensating specific strengths and weaknesses associated with particular methods (Denscombe, 2008).

Creswell (2015) classified three basic forms of Mixed Methods. The convergent parallel mixed methods, explanatory sequential mixed methods and exploratory sequential mixed methods.

Convergent Parallel Mixed Methods Design: Researchers collect qualitative and quantitative data separately and analyse them separately and then compare the results to determine if the finding confirms or disconfirms each other (Creswell, 2015).

Explanatory Sequential Mixed Methods Design: The mixed methods, which involved two phased of project, first phased researcher collects quantitative data and analyse quantitative data, then use the result to plan the second phases (Creswell, 2015).

Exploratory Sequential Mixed Method Design: this is the designed Mixed Methods, which researchers first begins by exploring with qualitative data and analysis and then uses the finding in a second phase. In this method, there are three phases procure with the first phase as exploratory, the second as instrument development, and the third as administering the instrument to a sample of a populations (Creswell, 2015).

These methods guide the researchers to frame their research. Based on the context of the research, the Exploratory Sequential Mixed Method design was selected because there is lack of in-depth knowledge in the e-learning in context of Sri Lanka.

3.3 Research Design

A research design is a procedural plan that is adopted by the researcher to answer questions validly, objectively, accurately and economically (Kumar, 2012). For this research, the Exploratory Sequential Mixed Method Design was employed. The method has a three-phase procedure with the first as exploratory, the second as instrument development, and the third as administering the instrument to a sample of a population (Creswell, 2015). These three phases were depicted as follows:

Exploratory → Instrument Development → Administering Instrument

The research framework was constructed according to above model with three phases
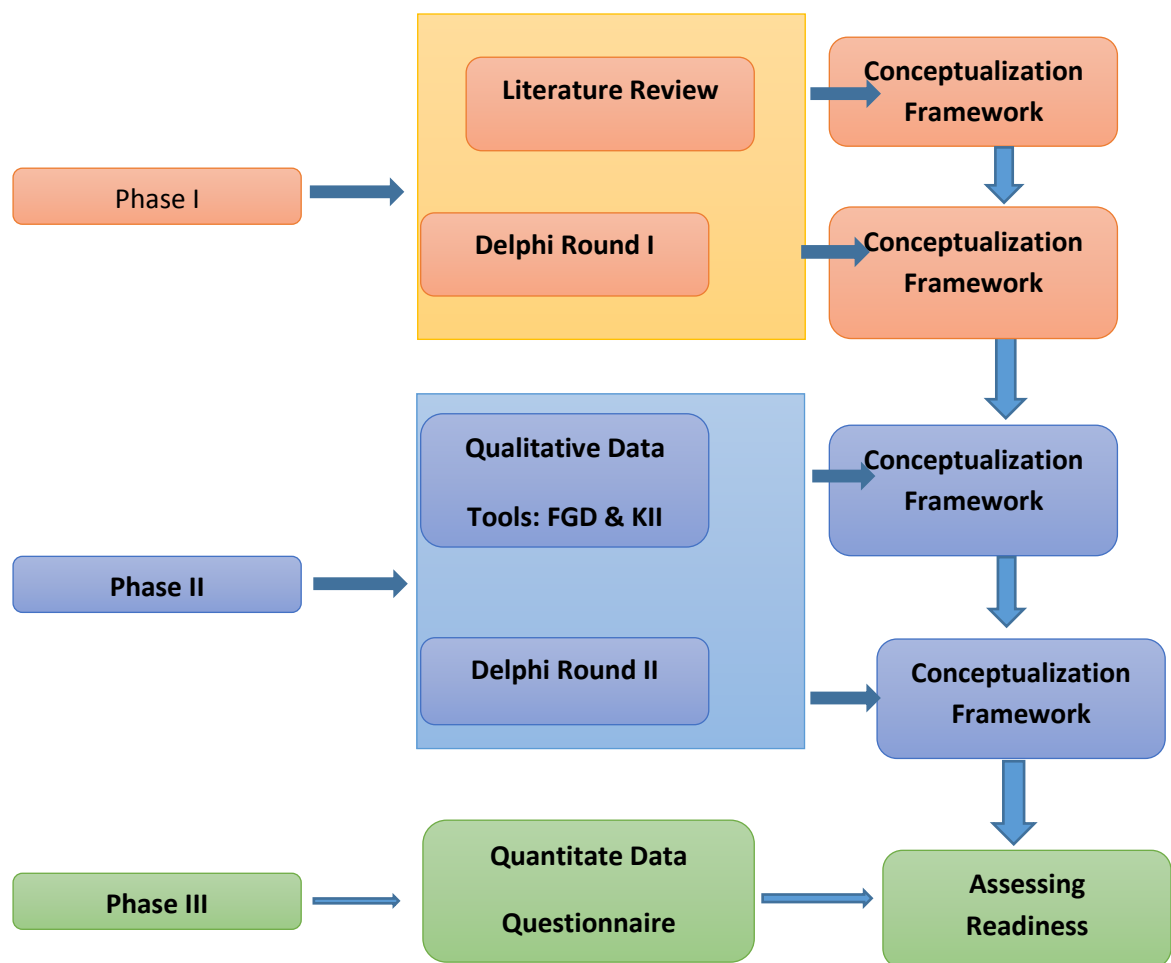
Figure 3.1: The research designing framework for this study

This study is designed in three phases: The first phase is Delphi Methods, The second phase is qualitative data collection and the third phase is quantitative data collection

First Phase:

Delphi Method:

The Delphi method was originally created by the RAND Corporation in the United States in the 1950s, and has been widely used for decision making, policy making and forecasting future issues. In this study, the two rounds of the Delphi technique were

applied: the first round follows the literature review and second is after qualitative data collection.

During the first round, based on the literature review, the factors which impact on e-learning usage, were identified and the DELPHI method was used to determine the validity of the proposed framework by experts in various fields from the education sector. Because of the exploratory nature of this research, in this two-round Delphi method, the panel of experts included 10-15 educationists and experts in e-learning. The name list of the expert panel is provided in Annexure.1. The composition of panel of experts is given below table 3.1.

Table 3.1: Details of Delphi Techniques panel members

No	Designation	No of members
1	University lecturer (Computer unit and Department of Education)	3
2	Officers from Ministry and Provincial Department of Education	2
3	Deputy Director of Education (from selected Zones)	2
4	Assistant Director of Education and In-Service Advisors	2
5	Principals	1
6	Teachers	2
7	E-learning resources persons	2

In the first round: The identified factors from the literature review were given to the expert panel and panel members t review the factors and sub component. They discussed and suggested that factors were found in the literature review, which needed to be classified according to the hierarchy of education systems in Sri Lanka. Subsequently, the following format was compiled and distributed among the expert panel members. They classified individually and the research assistant collected all formats and entered these in the Excel sheet. The format was shown in multimedia. The panel discussed the duplication of factors and concluded with the following amended list of factors.

No	Factors	National Level	Provincial level	Zonal/Divisional level	Schools level
1	Dimension • Sub dimension				

After classification of factors, research prepared format give below to rank the factors according to important and level facilitation/ influence on implementing e-learning at school in Sri Lanka.

No	Factors	1	2	3	4	5
1	Dimension • Sub dimension					

The panel ranked the factors according to their view individually and thereafter the researcher entered all ranks in the Excel sheet and sum all marks altogether and prioritized factor. Based on these factors, the basic conceptual framework was developed. Based on the conceptualization framework, qualitative data collection tools were developed: Key informant Interview Guide (KII) and Focus Group Discussion (FGD)

Phase Two

Key informant interview (KII)

Key informant interviews (vide Annexure –II) were conducted with key informers-officers from Zone Educational Offices and Department of Education and Ministry of Education.

The participants were selected from a purposive sample. The Assistant Directors of Education (ICT) in the zonal level and provincial level were selected. In addition, the Deputy Director of Education (Development) at the provincial level was also selected for this research. The resource person for E-Learning at the Ministry of Education and selected Principals were also selected for this study. The details of the population that was sampled is given in the following table 3.2.

Table 3. 2: Details of participants for Key informant Interview

No	Participants/ Institutes	Target No of Interviews
1	Ministry of Education and PD office	6
2	Zonal level officers	6
3	Principals	6

The guidelines for KII were prepared based on the literature review and the first round of the Delphi Method that was used. The pilot KII was conducted with an ADE (ICT) in the Jaffna Zone along with a transcript of the voice recording. The research team reviewed and ascertained from the transcript whether all requisite data was covered or not. There were some errors in the guidelines of KII and FGD. The order of questions was revised according to the data flow. More questions were added to the guideline. Subsequently, the different KII guidelines suitable for officers in Provincial Department of Education, Zonal Education Office and Principals, were compiled at schools. In addition, the consent form was developed for all participants.

Data collection procedure: Interested participants were requested to participate in the KII and researchers sent the information, approval letter, consent forms and KII Guidelines prior to two days of the interview. The Tamil medium KII was conducted by the principal researcher assisted by a co-researcher/research assistant and the Sinhala medium KIIs were conducted by co-researcher, who is also the Deputy Director of Education (Planning), Provincial Department of Education, and in the Southern Province with the principal researcher and research assistant. On interview day, the guideline was clearly explained to each participant. Subsequently, they were requested to du\ly fill in the consent form, which included the permission for recording the voice of the participants. Thereafter, during the interview, the voice of participant was recorded by a recording device and phone. We used two devices for recording the voice, in order to avoid mis record. Simultaneously, notes were taken by the researcher assistants. The voice recordings were saved and stored on the computer which had password protection. Thereafter all voice records were transcribed by the research assistant.

Focus group discussion (FGD)

The FGD guideline (Annexure –III) was prepared based on the review of literature and Delphi Technique Round One . Two separate guidelines were prepared for teachers and students from Grade 9 to 11. Next, the pilot FGD was conducted in one school for teachers and students. Thereafter, the guidelines were revised based on the pilot participants suggestions and reviewed by the research team. A data sheet was also developed to record the demographic data of participants in the FGD.

Table 3.3: Details of participants for Focus Group Discussion

No	Participants/ Institutes	Target No of Interviews
1	Teachers	6
2	Students	6

The participants were informed 2- 3 days, via the principals of the school. The discussion with principals, the participants were selected from Grades 9 to 11 of students and teachers who teach subjects for Grades 9 to 11. Eight to ten teachers and students participated in the FGD. The discussion was approximately one and haft hour for each session. The Tamil medium FGD was conducted by the principal researcher with one co-researcher/research assistant and Sinhala medium FGDs were conducted by co-researcher who is also Deputy Director of Education (Planning) Provincial Department of Education, in the Southern Province, with the principal researcher and research assistant During the FGD, the purpose of research was clearly explained to teachers and students and thereafter, the consent forms were distributed to all participant. During the FGD, the voices were recorded by a voice recorder and mobile phone. Thereafter, all voice recordings were transcribed by the research assistant

Second round of Delphi: The identified factors and readiness for e-learning both for teaching and learning were identified through the qualitative data collection. First, all the factors were identified in KII and FGD, were listed in the Excel sheets and given to each expert in the panel. They ranked all factors according to their views. The team member collected all the Excel sheets and entered the data in a summary sheet with prioritized factors.

Developing Critical Success Factors Framework (CSFF) for implementing e-learning

There was syet no clear analytical framework which could be identified that was suitable and scientifically complete for our research purposes. Therefore, researchers needed to develop the CSFF for implementing e-learning at school level. Following a top-down approach, it was determined that the CSFF should have a three-layer hierarchical tree structure (Sun, Finger, & Liu, 2014). The first-layer attributes, according to the related research literature, would define the dimensions of implementing e-learning. The second layer would show the sub-dimensions of the upper layer developed after first Delphi techniques, which included dimensions driven from the literature review, while the attributes in the third layer would be the research themes of each sub-dimension. The research themes which were provided in the third layer of the CSFF were compiled from qualitative data analysis and second round Delphi Technique.

Third Phase

The Critical Success Factors (CSF) were identified from the literature review and qualitative analysis. The questionnaire was developed based on the factors found during the first phase and the second phase. The questionnaire comprised of the school profile, ICT profile of the schools, students' readiness and teachers' readiness for usage of e-learning for teaching and learning at schools in Sri Lanka, readiness of the Provincial and Zonal level Administrative system, readiness of schools and the acceptance of principals. The questionnaires were prepared with five-point Likert scale from fully agreeing to fully disagreeing. The detailed description is given in the following table:

Statement	Readiness Scale	Percentage of teacher/Students
Fully Agree	1	81-100%
Agree	2	61-80%
Neutral(Agree/Disagree)	3	41-60%
Disagree	4	21-40%
Fully Disagree	5	1-20%

Piloting of the questionnaires

In a pilot survey a preliminary draft of f five principals from different schools were selected through a sample random method and given the questionnaire to be read and

include comments on the the question items. Thereafter, some modifications were made to the questions. In addition, the questionnaire was distributed amongst Senior Lecturers of the Computer unit and Department of Education, University of Jaffna and their advice also was incorporated in the questionnaires.

3.4 Sampling Method

There are nine provinces in Sri Lanka. Two provinces will be selected for this study such as the Northern Province and Southern Province. Stratified random sampling will be employed for this study. According to the school classification of the Ministry of Education, there are four types of schools: type 1AB, 1C, II and III. In this study, type III schools were excluded because this study covered students from Grades 6 to 11. The number of schools and Zonal Education Office are given in this Table 3.4.

Table 3.4: Details of schools and Zones in Southern and Northern Province

Province	No of Zone	Schools Type			
		1A	1C	II	Total
Southern	3	18	25	44	87
Northern	3	12	13	36	61
S. Size	6	30	38	80	148

Source: Census Data of Ministry of Education, 2016

The Sample was selected based on Morgan Table. Based on the workload and funding limitations, the data were planned to collect from 50% of the sample Thereafter the total sample was divided into proportional basis for each type of schools. The details of the sample are provided in Table 3.4. below:

The schools were ordered in the census number order and selected by using random number table within the clusters.

3.5 Data Analysis

Qualitative data analysis: A code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data. Coding is a heuristic (from the Greek, meaning "to discover") – an exploratory problem-solving technique without specific formulas to follow. Coding is only the initial step toward an even more rigorous and evocative analysis and interpretation for a report. Coding is not just

labelling, it is linking (Saldana, 2009). According to Saldan, 2009, the coding processes are divided into two main parts: first cycle coding and second cycle coding. These main categories have the techniques. In this study, the first coding process, the descriptive coding and in vivo coding techniques were selected based on the study objectives and in the second cycle coding, the pattern coding technique was selected. Each coding cycle are briefed as follow

First Cycle coding

Descriptive Coding: Descriptive coding summarizes in a word or short phrase most often as a noun- the basic topic of passage of qualitative data. Descriptive Coding assigns basic labels to data to provide an inventory of their topics. Many qualitative studies employ descriptive codes as a first step in data analysis because descriptive coding is appropriate for virtually all qualitative studies, but particularly for beginning qualitative researchers learning how to code data, ethnographies, and studies with variety of data form (interview transcripts, field notes, Journals, document, diaries) (Saldana, 2009).

In vivo coding: In vivo's root meaning is" in that which is alive" and as a code refers to a word or short phrase form the actual language found in the qualitative data record, the term use by the participants themselves (Saldana, 2009).

Second Cycle

The Second cycle coding method is an advanced way of reorganizing and reanalysing data coded through first cycle methods. The primary goal of second cycle coding is to develop a sense of categorical, thematic, conceptual and theoretical organization from the first cycle codes (Saldana, 2009).

Pattern coding: Pattern codes are explanatory or inferential codes, ones that identify an emergent theme, configuration, explanation. They pull together a lot of material into a more meaningful and parsimonious unit of analysis. Pattern coding is a way of grouping those summaries into a smaller number of sets, themes, or construct (Saldana, 2009).

Process of qualitative Analysis: The thematic analysis was conducted to fulfil the qualitative analysis part of this mixed research method. The all -voice records were transcribed by the research assistants and the transcripts were provided code for confidential purposes. Each schools was named as School 1,2…etc. and officers were named as officer 1,2 …etc. These coding systems are given in following tables 3.6 and 3.7.

Table 3.6: Details of selected schools for FGD and KII

No	School Name	Zone	Category	School Type	Principal	Teachers	Students
1	School 1	Mannar	National	1AB	P/NP/M1	T/NP/M1	S/NP/M/1
2	School 2	Mannar	Provincial	1C	-	-	S/NP/M/2
3	School 3	Mullaitivu	Provincial	1AB	-	T/NP/Mu 2	S/NP/Mu/3
4	School 4	Mullaitivu	Provincial	1C	P/NP/Mu2	T/NP/Mu 3	S/NP/Mu/4
8	School 5	Jaffna	Provincial	1AB	P/NP/Mu3	T/NP/J/4	S/NP/J/5
9	School 6	Galle	National	1AB	P/S/G/4	T/S/G/5	S/S/G/6
10	School 7	Matara	Semi Government	1AB	P/S/M/5	T/S/G/6	S/S/M/7

Table 3.7: Key informant Interview

No	Designation	Office and Address	Code
1	Officer 1	MoE, Isurupaya	O/M/1
2	Officer 2	Provincial Department of Ed Galle	O/S/P/2
3	Officer 3	Provincial Department of Ed Galle	O/S/P/3
4	Officer 4	Zonal Education Office , Matara	O/S/Z/4
5	Officer 5	Zonal Education Office, Deniyaya	O/S/Z/5
6	Officer 6	Zonal Education Office,Udugama	O/S/Z/6
7	Officer 7	PD office, Northern Province	O/NP/P/7
8	Officer 8	PD office, Northern Province	O/NP/P/8
9	Officer 9	Zonal Education Office, Jaffna	O/NP/Z/9
10	Officer 10	Zonal Education Office, Mannar	O/NP/Z/10
11	Officer 11	Zonal Education Office, Mullaitivu	O/NP/Z/11

Tamil transcripts were checked by the principal researcher listening to voice recordings and Sinhala medium voice records were transcribed into English by the part time research assistant who is native Sinhalese, and BSc graduate from University of Jaffna. Subsequently, all transcripts were imported into the Nvivo pro 12 software and the thematic approach was employed based on the conceptual framework developed during the literature review and first round of Delphi Techniques. The snapshot of analysing view in NVivo 12 PLUS are shown below:
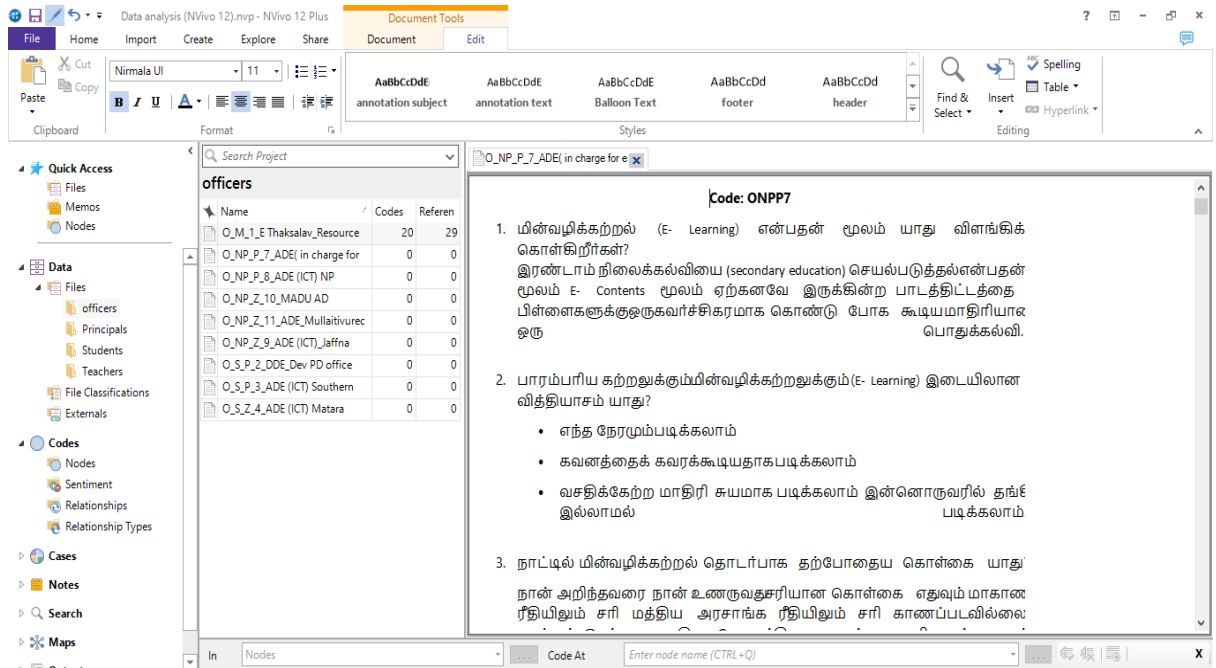
Figure 3.2 : NVivo snapshot of resource uploaded view
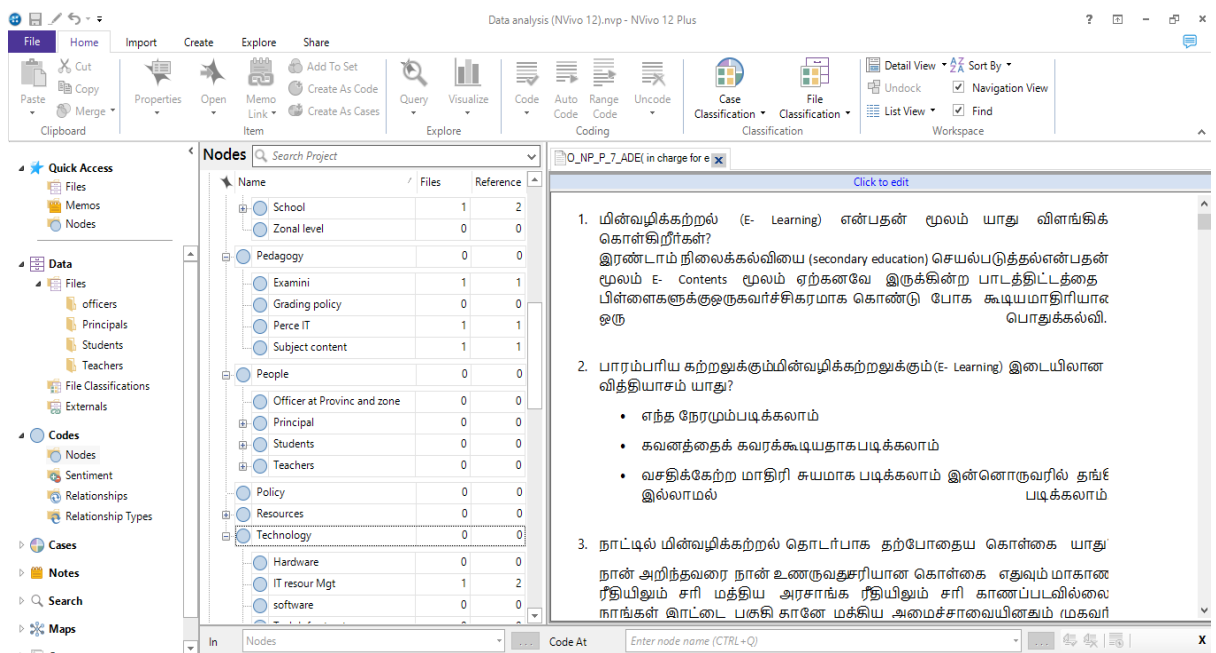
Figure 3. 3 : NVivo snapshot of nodes view

Quantitative data analysis:

Questionnaire are based on a five-point Likert Scale with the leftmost and rightmost anchors being "Fully Disagree to Fully Agree". The likert-scale questions were code with 1 indicating the lowest readiness and 5 the highest. As the choice were coded as 1,2,3,4, and 5, it is suggested that the mean score of 3.40 can be identified as the

expected level of readiness for e-learning. The below figure is depicted detail of readiness, which was modified according the requirement of studies
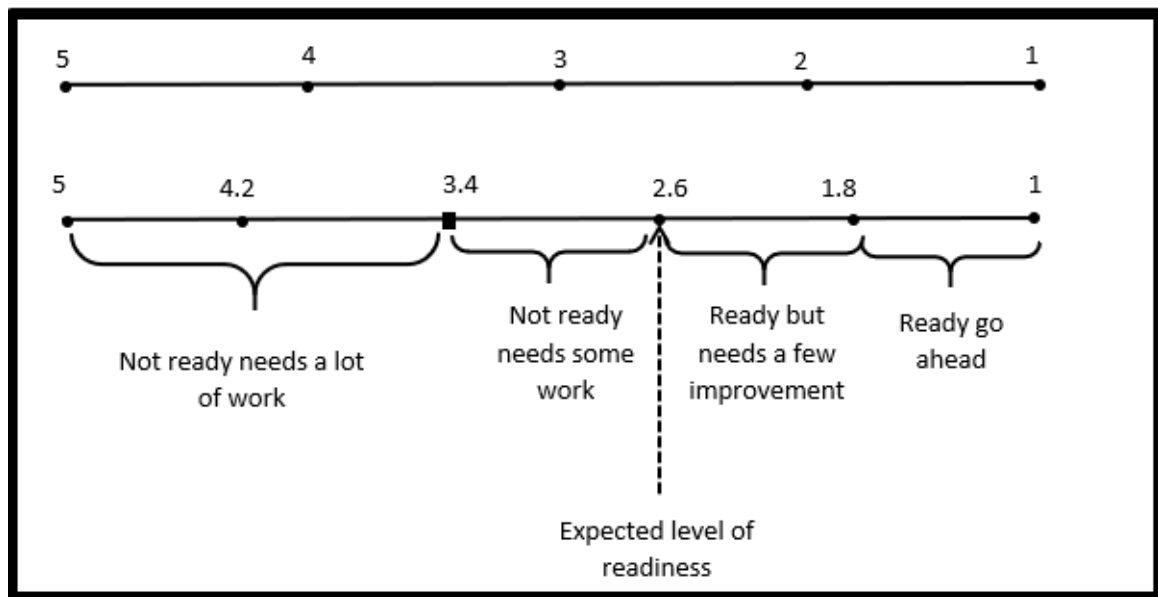
Figure 3.4: Modified E-learning readiness assessment scale
Source: Aydin & Tasci, (2005)

The scale was utilised by more researchers such as (Aydin & Tasci, 2005; Ouma, Awwor & Kyambo, 2013; Unal, Alir & Soydal, 2014; Pathiratne, 2014; Paksoy & Tiar, 2017.)

The means and standard deviations were used for description of finding. In order to assess the difference concerning the readiness factors between Provincial Schools and National Schools, Southern Province Schools and Northern Province schools, cross-tabulation analysis (Chi-Square) tests were used. The data were analysed by using the Statistical Package for Social Science (SPSS) version 21.0.

CHAPTER 04:
DATA ANALYSIS AND FINDING

4.0 Introduction

The main objective of this study is to identify the current level of e-learning implementation and develop a contextual model of factors to guide the introduction and use of e-learning in at schools in Sri Lanka, based on the perceptions of the participants. This Chapter and the next one address this objective. Based on the interview data, they answer the two research questions and provide a base for reviewing and revising the conceptual model. Third questions will be answered by the quantitative analysis

1. What is the state-of-the-art in regard to trends and practices of e-learning at schools in Sri Lanka?

2. What are necessary factors for facilitating effective e-learning at schools in Sri Lanka

3. To what extend are schools prepared for teaching and learning through e-learning in schools in Sri Lanka?

4.1. Perception of usefulness of E-learning

In the modern world and current skill requirement are far different. Therefore, the future work force should be prepared to meet demand of job market. In this scenario learning and teaching Method also should adopt new innovation. The modern people perceived learning and teaching in innovative way. One of participant from provincial level stated

> *"Students carry a heavy bag filled with big books and teacher are busy with documentary work than teaching. But if we implement e-learning system at school they are free from it. Teaching and learning will be simple and easy (O_S_P_2)"*

Perception of usefulness of e-learning for students

The success of e-learning mainly depends on the students' perception and their usage. The data analysis reveal that the e-learning gives benefit for students such as clear understanding, creativity, individual attentions and motivation for low performing students.

If we look at the students, the fewer students are the ordinary students and the more talented the students are there. This e-learning is a good thing to help the ordinary students. We have to encourage them. Can increase the success of those students (O_M_1)

Similar view, one of the officer working at provincial level shared his experience why e-learning need for students and how it benefit rural schools in Sri Lanka.

I went to Eluvaititu in Jaffna and asked the students who saw the CTB bus. Only four children raise their hands. Because they only come to Nallur festival. Eluvaitivu is a sinful place. Multimedia can be set up for those schools. The students even saw the real picture in the e-lesson. It is very helpful for rural students (O_NP_P_7)

Another education officer shared his experience. There was one school where students are drop out. Then new principal come to school and introduce SMART learning system at school. All the students were given opportunities to study using SMART board. He noted

"As the child becomes more interested in what is being done within this digital, their attendance should increase. Children who were irregular attendance, begin to come regularly because of the eager to touch SMART board and learn through the system (O_NP_P_8)"

Further added by education office from Mullaitivu District

Although it is a model that can attract children. At that level it is hoped that children will find it easier to go through e-learning than reading books normally. (O_NP_Z_11)

He further noted

E-learning systems is helpful to understand quickly and It will lead self-learning. Further, It is really helpful for school where there are no practical facilities. For example, Schools started Technology Stream without Lab facilities. If students watch e-lesson practical, then they can answer properly during the exam (O_NP_Z_11)

The e-learning give clean understanding for students and students get real experience learning through digital contents. One of the participants shared with example

For example, During the Geography lesson, I was in the classroom for visit. Teacher show all pictures, if they need to draw in black board. It is time consuming process. And difficult for students to understand clearly, but

teacher show digital media picture from the internet. The students clearly understood lesson. During the evaluation, the students did most of the question correctly (O_NP_P_8)

During the focus group discussion with teachers' group, a teacher expressed that

"if I teach through e-lessons, students easily keep remember because they watch real model and pictures, but If traditional method, they only watch pictures drawing in black board. Further another stated similar view "student easily understand than traditional method. For example, If I teach Maths, I can explain two or three time for low performing students during the class time. Sometime, they could not understand properly then, they can repeatly watch several times. It is helpful for them. In addition, other teacher mentioned "if e-learning system, teacher is absence sometime, students can learn at computer lab with help of computer lab assistant. Therefore, Teachers 'burden could be reduced to complete syllabus quickly" T_NP_M_1

One of the key informant interviewees who has long experience in teaching and working in e-learning implementation at national level stated that

I can spend time with the students individually because there are more time available for me if I used e-lesson. I play video or give interactive activities for students. They will learn them self. I individually take care of low performing students and motivate them. O_M_1

According to the statement, there was great benefit for student if teacher use e-learning system and it give equal opportunities for all students

One of the principals who are from Jaffna District expressed that

"E-learning system is very helpful for low performing student. For example, if they cannot understand the lesson during traditional class, they do not have chance to watch repeatly but in the e-learning system, students could not therefore, it is great help for low performing students. For example, one day I taught how to write essay I show relevant video for that and then I asked student to write essay. I observed low performing student also interestingly involved writing essay. It is very helpful system for low performing students. They get real facts of lesson and practical experience through e-lessons. I hope this system will help to increase the low performing student into average students for example, if students are scoring below 35 marks in term exam, it will support to score above the 35 marks in final exam (P_NP_J_1)"

The learning system provide great benefit for students such as real experience for students, clear understanding and easy retains, individual attention motivation for

participating learning. If it is not only benefit for student and also great benefit for teachers.

Perception of usefulness of e-learning for teachers

The Data analysis reveal that e-learning system influence on teachers. It is very helpful for teacher day to day teaching and learning activities. Teachers are in the initial stage face difficulties to adopt e-learning system, but if they used to it then, they realised benefit of e-learning. They will themselves integrate the e-lesson in their day to day teaching.

During the focus group discussion, one of experience teacher noted that

> *"In the traditional method it takes long time for preparing lesson. For example, I have 40 period per week therefore, It is very difficult to complete lesson and prepare next week lesson. If we have the e-learning system, It is very easy to teach for student and only it takes half period for teaching and rest of the time we can use it for checking exercise book of students. Otherwise we need to take all note book to home and correct and bring back next day. Therefore, if we follow e-learning system, we can reduce our work load and give more practices for students (TNP M1)"*

Further one of the principals expressed similar view.

> *"E-learning reduce work load for teacher and reduce wastage of time. The teachers teach lesson and give more exercise and practical work for student, therefore, student get more understanding on the subject (P NP Mu 2).*

Further adding similar view by teachers from Southern Province during the focus group discussion

> *"It is better to have a modern way of presenting learning materials [such practical] to students" "Blackboard and text book is not enough to explain complex things properly" "Students are curious to involve in e-learning activities than traditional classroom activities" "ICT teachers are using multimedia projectors to teach students" "We can request Wi-Fi router from principal, on demand with limitations" T_S_G_3*

4.1.2 Current level of e-learning implementation

E-Learning system reduces teachers work load and give more time for preparing lesson therefore it helps teacher to remain as motivation. Further it is easy tool to explain complex subject matter clearly with short period time.

Projects initiated by the Government on e-learning for the general education

There were a lot of initiative taken by the government to implement e-learning in the general education system for example Nenasa Telecasting Programme, e-content in digital form, e-Thaksalawa Learning Management system etc.

> *The Nansa programme introduced by the Ministry of Education for grade 10 and 11 students. It is TV telecasting programme. There is no programme for Tamil medium students. There is only programme for Sinhala medium. Even a few Sinhala medium schools use this programme properly (O_M_1)*

Further added similar views

> *The government introduce several programmes to introduce e-learning system. The Department of Education, Northern Province also gave content in DVD format for Grade 10, 11 and A/L Science Stream, but those DVD are not used at most of the classroom O_NP_P_7*

One of the participants who had experience and qualification ICT stated that

> *National Institute of Education developed digital content for several grade on local curriculum, but most of them are not used in the classroom now a days (O_NP_P_8)*

Similar view suggested by the participant from Mannar District

> *Some e-learning programme emerged from foreign funding. After funding period finished, the project also come to the end. For example, one the world Bank fund programme teachers were trained on information communication and conduct competition on developing digital lesson, but now teacher did not apply their skill for teaching and learning (O_NP_Z_10)*

Another large programme initiated by the Ministry of Education is E-Thaksalawa. The students and teachers face difficulties to access the digital contents from the LMS. One of the key informant interviewees who was in-charged for ICT in the particular Zone, stated

E-Thaksalwa is a big programme for e-learning in Sri Lanka, but schools face difficulties to use it content because of unavailability of internet facilities (O_NP_Z_10)

Further, participant from Southern Province stated as follow

"E-Thaksalawa is there. It is using in school though" "Nenasa is a good resource but that time table must be adjusted with school time table. Since it is a real time casting, and showtimes are out of school time, we have no ability of showing Nenasa TV contents in schools O_S_Z_4

The data analysis reveals that the government projects for e-learning implementation as at begin stage. There was no proper mechanism to operate effectively and efficiently. The most of the project were not sustainable.

Digital contents availability for students and teachers

In the general education system in Sri Lanka, E-Thaksalawa is a very big Learning Management System (LMS). Its content grade 1 to 13 syllabus of Sri Lanka curriculum. One of the participants from central Ministry of Education mentioned that

"We try our best to develop all local syllabus into digital format. In Sinhala medium, we covered nearly 60 percentage of curriculum, but Tamil medium there are less than the Sinhala medium. We uploaded most of required digital content. We continuously take effort to develop content. Currently we started to develop digital content for A/L Science and Technology Stream subject, which are reference notes for students. It is not progressing (O_M_1)

In addition, E-Thaksalawa content, the Provincial Department of Education, Northern Province developed digital content. One of the participants who was in-charge for e-learning implementation stated:

The Department of Education, Northern Province produce e-lesson for Grade 10, 11 and A/L Science Stream. There is no interactive lesson. There is only video lesson. At the beginning, it is enough for students (O_NP_P_7)

Even though, the Ministry of Education and Provincial Department of Education prepared e-lesson, but there is lack of e-lesson in general education in Sri Lanka.

English has resources in Sinhala but less in Tamil. So, there is a need to create content in Tamil O_NP_Z_10

Similar view expressed by another participants

> *If you want to take physics normally, it will be difficult to see that physics will go in Tamil and then it will be useful if it is more in Tamil. Depending on what the kids come up with and we say totally O_NP_Z_11*

Further adding by the principal,

> *I think there are few contents in Sri Lankan local syllabus comparing English Medium. It is good to prepare e-lesson from Grade 6 to 13. My advice is that Department of Education prepare digital content suitable for students who are different competency level (P_NP_J_1)*

Accessibility of available digital contents

The digital contents are very few in the local syllabus of Sri Lanka. But the students use available digital content in vast scale. The E-Thaksalawa was accessed by the student very frequently. One of the participants who was resource person for preparing e-contents for E-Thaksalawa stated

> *E-Thaksalawa, students access it very frequently. For example, student have more than 1000 share per day and 30000 students access the content in the E-Thaksalawa. During the examination time, more than 1 million students accessed the contents (O_M_1)*

In addition, E-Thaksalawa contents, students are very eager to use e-content available in digital devices. One of Assistant Director of Education and in-charge for ICT stated that

> *Now in our zone, there is one school set up SMART classroom for all students and give tape for Grade 4 students. The students are very eager to learn through tape. If the student leave from the school after completing grade 5, they will get proper skill for required those day (O_NP_Z_11)*

In contrast view expressed by a key informant interview

> *The Provincial Department of Education provide e-lesson with DVD for Maths and Science in our province. Some teachers use it in their classroom. Most of the DVD were kept in drawer of the principals (O_NP_Z_9)*

Similar view expressed by the participant from Southern Province.

> *I think most of the teachers they do that or access and they have the knowledge about using* E-Thaksalawa *and Nenasa so those teachers are using*

and Nenasa also promote them southern province website so he always promotes them to go to site and upload lessons. I know some students are doing in that way but not all just a minority in addition to that one in our province we have establish some smart classrooms even for instance there some schools in Galle district they are having smart classrooms so in those not only ICT teachers some other subject teachers are also using O_S_P_3

Some teachers are very interesting on teaching through modern techniques. One experience assistant director of education states that

Some teachers are using PowerPoint presentations created by themselves O_S_Z_4

During focus group discussions, a teachers stated that

"We have a SMART classroom in our school use it weekly based on time table"

Another teacher said

"Our teacher for geography, Mathematics, Science use the SMART board" (T_S_G_4)

Further based on questionnaires, following data designated classroom for e-learning availability of digital content at schools and availability of digital equipment required for implementation of e-learning.

Availability of designated classrooms for e-learning in the Northern Province

Exploring current level of implementation at e-learning at school, the research was designed for evaluate how school implementing e-learning and availabilities of digital content at school level. First, current level of implementation which as divided into three parts implementations in Northern province, Southern Province and comparison overall level of implementation.
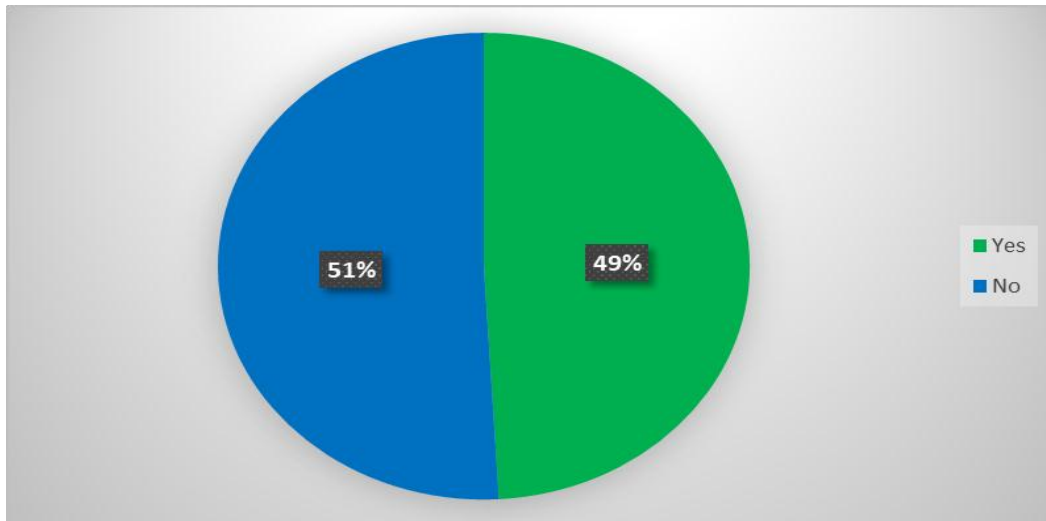
Figure 4.1 Availability of designated classrooms for e-learning in the Northern province

The initial step in using e-learning effectively is to assess readiness to come from organizational and personal perspectives. This may help them avoid wasting their resources and misusing e-learning. Exploring the extent to which school is ready for e-learning helps to set strategies for e-learning and to effectively implement its objectives. We ask how many of them have assigned classrooms? Most of the schools there responded that they did not have e-learning classrooms that is (51%). in the Northern province.

Availability of equipment for e-learning in the Northern Province
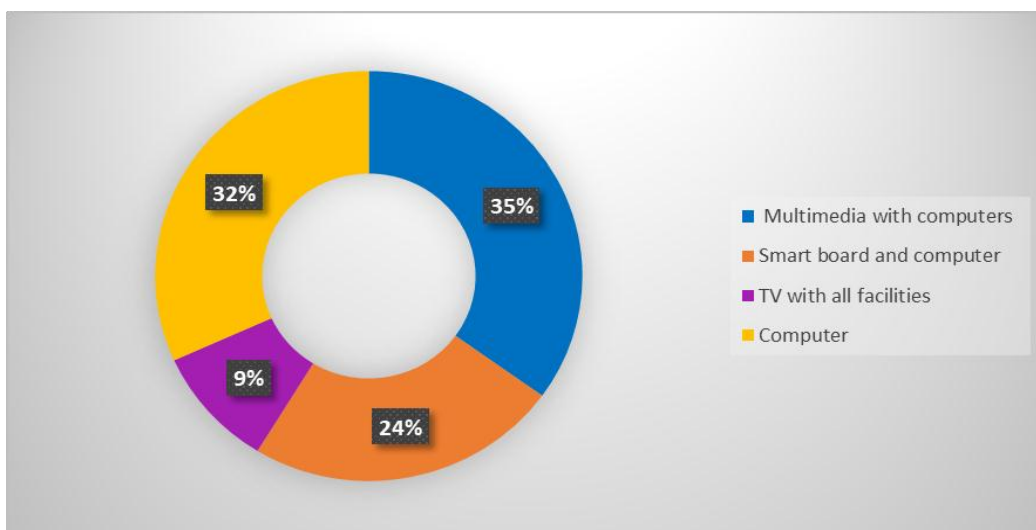
Figure 4.2 Availability of equipment for e-learning in the Northern Province

As can be seen from the figure 4.2. the availability of e-learning equipment in the Northern Province is shown. According to the Principal perception, a large number of

classrooms have multimedia with computers (35%) and a minimum number of classrooms have facilities with TV (9%). They are ready to use smart boards in the classroom, but a limited number of classrooms have a smart board on the computer, most schools in Northern Province computers, but that is also not enough

Availability of designated classrooms for e-learning in Southern Province
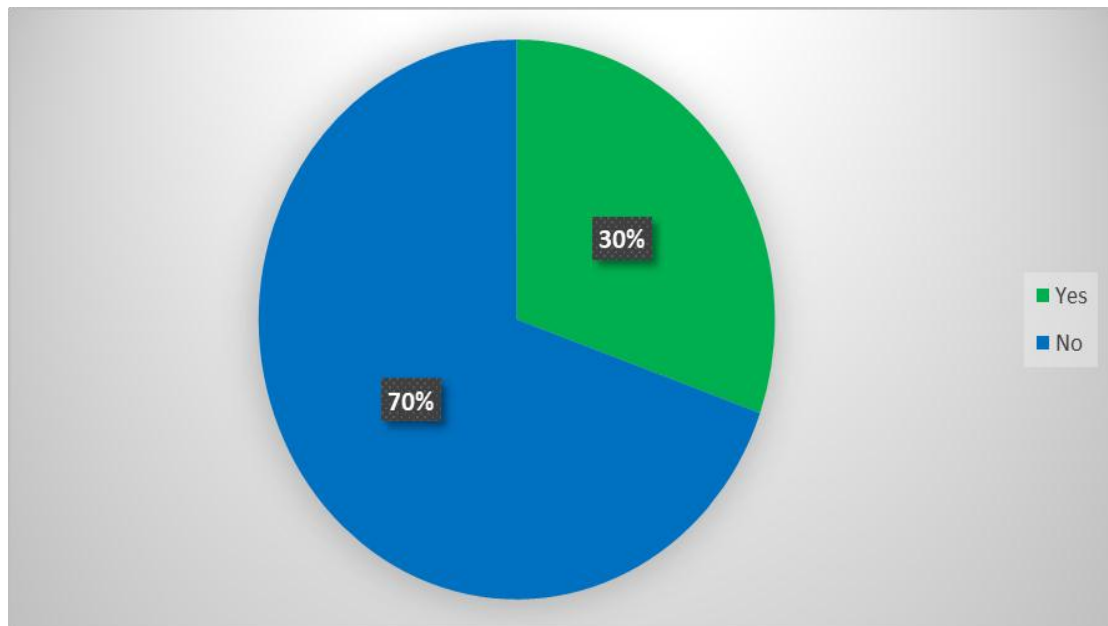
Figure 4.3 Availability of designated classrooms for e-learning in the Southern Province

The initial step in using e-learning effectively is to assess readiness to come from organizational and personal perspectives. This may help them avoid wasting their resources and misusing e-learning. Exploring the extent to which school is ready for e-learning helps to set strategies for e-learning and to effectively implement its objectives. We ask how many of them have assigned classrooms? Most of the schools there responded that they did not have e-learning classrooms that is (70%) in the Southern province

Availability of equipment for e-learning in the Southern Province
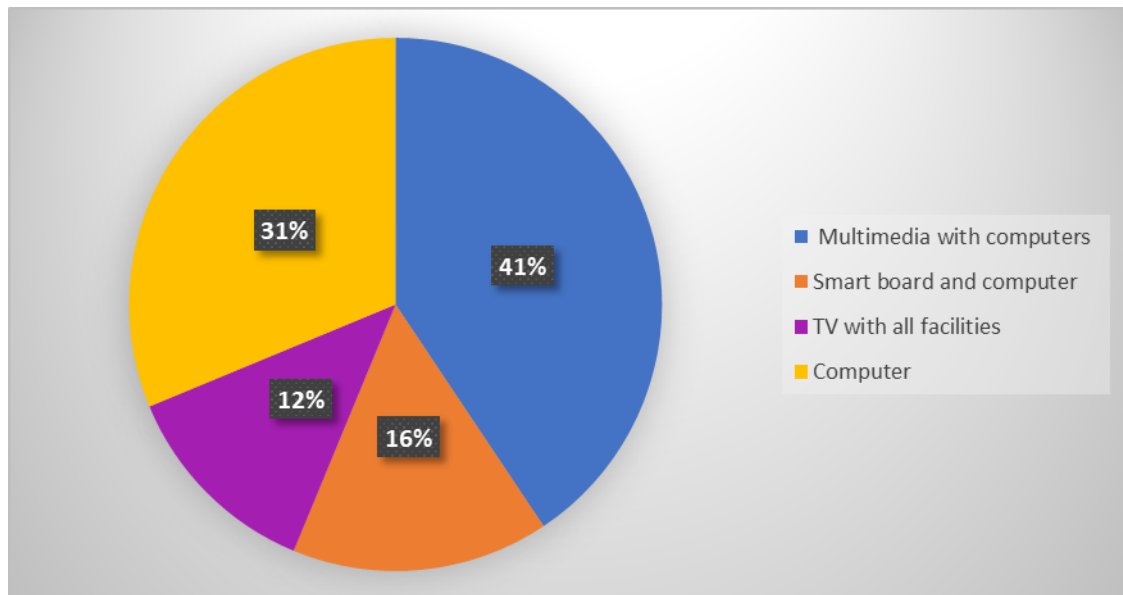
Figure 4.4 Availability of equipment for e-learning in the Southern Province

We learned at the school level according to the figure above, when we think of hardware and software facilities in schools for e-learning. As can be seen from the chart, according to the Principal perception, a large number of classrooms have multimedia with computers (41%) and a minimum number of classrooms have facilities with TV (12%). They are ready to use smart boards in the classroom, but a limited number of classrooms have a smart board on the computer, most schools in Southern Province have computers, but that is also not enough.

When we compare the availability of designated classrooms and availability of e-learning equipment for the both Northern and the Southern province respectively 49 % and 30% , According to that in the Northern Province availability of designated classrooms are more than the Southern Province but that is also not enough for them to develop they need more classrooms for e-learning. Then we consider about the availability of equipment for e-learning both province have equipment but that is not enough to implement e-learning mostly the schools have the computers with multimedia the number of computers also not bad they have limited number of smart boards and TV with all facilities to use the digital content therefore they need more equipment and need more attention towards the development of e-learning in the Northern and Southern Province.

.Availability of Digital Content at Schools in the Northern Province
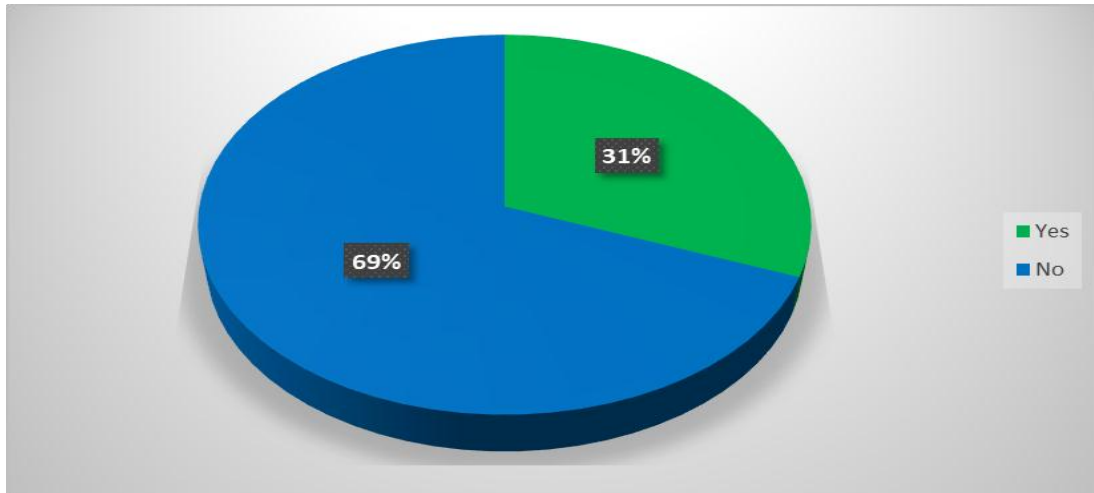
Figure 4.5 Availability of digital content at schools in the Northern Province

When we identifying factors that need to be developed further in order to implement e-learning we if there is digital content for teaching and learning there many schools don't have digital content for e-learning (69%). Only 31% of schools have digital content.

Access of digital content at school in the Northern Province
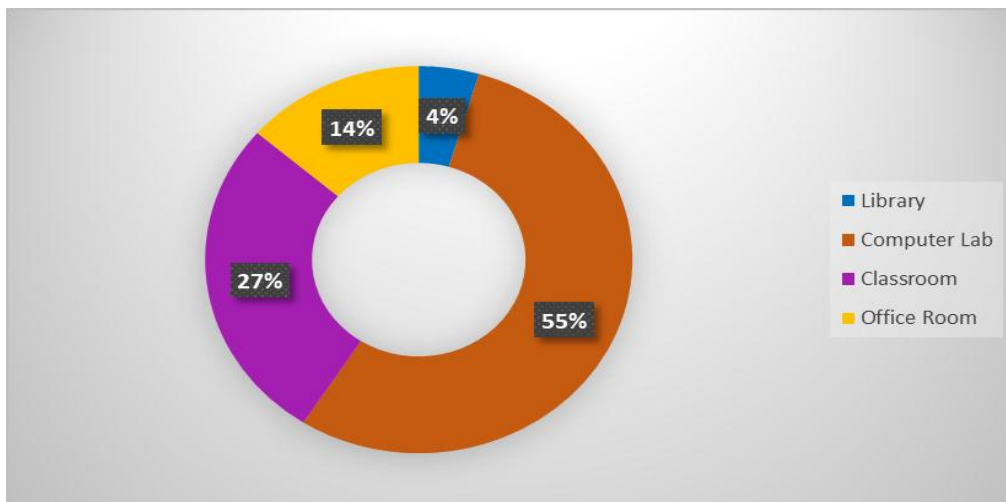
Figure 4.6 Access of digital content at schools in the Northern Province

The course can be done as an independent unit by copying all the instruction files in the digital content itself so that students can move quickly between the different screens of the lesson. Nowadays students are focusing their attention towards digital

content. In that way we asked how many of the schools have digital content and where? Many of the schools have in the computer lab (55%). A small number of schools had digital content in the office room (14%). Some schools have 27% of their digital content in the classroom. Fewer schools have digital content in the library (4%).

Availability of Digital Content at Schools in the Southern Province
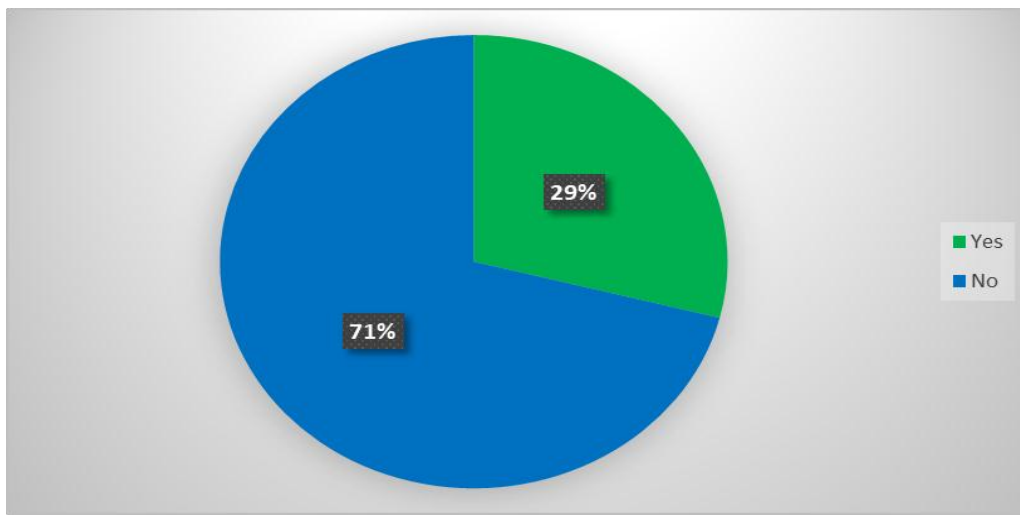
Figure 4.7 Availability of digital content at schools in the Southern Province

When we identifying factors that need to be developed further in order to implement e-learning we if there is digital content for teaching and learning there many schools don't have digital content for e-learning (71%). Only 29% of schools have digital content.

Access of digital content at school in the Southern Province
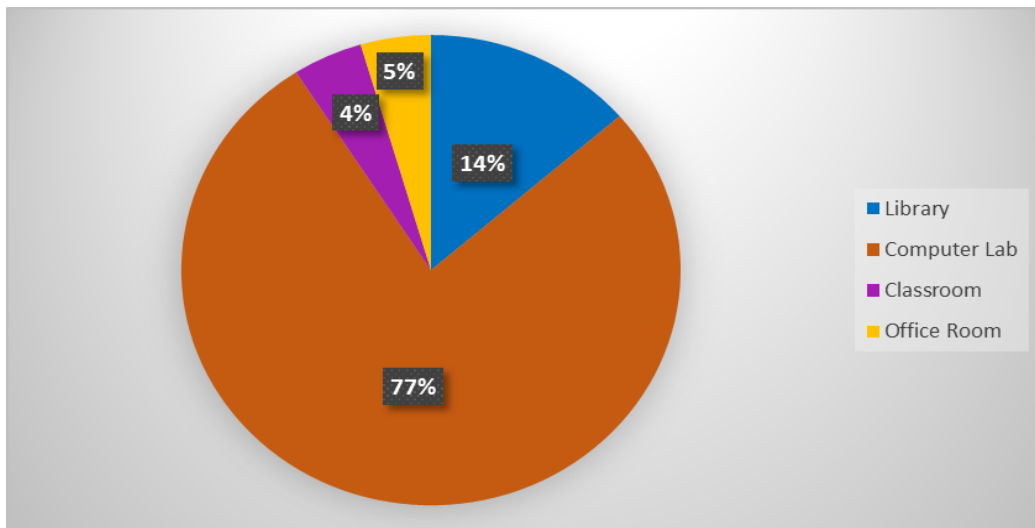
Figure 4.8 Access of digital content at schools in the Southern Province

The course can be done as an independent unit by copying all the instruction files in the digital content itself so that students can move quickly between the different screens of the lesson. Nowadays students are focusing their attention towards digital content. In that way we asked how many of the schools have digital content and where? Many of the schools have in the computer lab (77%). A small number of schools had digital content in the class room (4%). Some schools have 5% of their digital content in the office room. Fewer schools have digital content in the library (14%).

When we investigate the digital content availability and access of digital content in the Northern and Southern Province digital Contents availability in the Northern Province is little more than the Southern Province, Northern Province 31% and Southern Province 29%. When we look after the overall access of digital contents in school, they access their digital contents at different places like library, computer lab, classrooms and office rooms. In the northern and southern province, they access their digital contents mostly in computer lab respectively 55% and 77%. In the Northern Province minimum number of digital contents access in the Library 4% and in the southern Province 5% of digital content access in the office rooms.

4.2 Factors influencing on implementation of e-learning in the General Education Systems

4.2.1 Policy in General Education

Analysis of the interview and focus group data reveal that the Government policy are perceived to have influence on implementing e-learning at school level. There was no common policy for implementing e-learning and there was no proper co-ordination among the institutes which involved on implementing e-learning. There was no one common body to monitor and advise the implementation of e-leaning. One of charge for e-learning implementer from Provincial level mentioned

> "Every institute is taking steps to do this, but no one is taking it under the one umbrella, and I don't feel that way (O_NP_P_7)

According to the above statement, there was lack of coordination among the institutes. There was not only coordination but also strategic plan. Further added by the directors

> "So far there are no strategic plan to promote e-learning our province. Everything is going on in the traditional way (O_NP_P_7)

The above statement clearly expressed there was no clear long-term plan to promote e-learning at provincial level. There was no integrate policy for monitoring e-learning implementation with connecting the teachers' work. The monitoring team from the Zonal and Provincial level have tool to check completion of syllabus and what the student had done during the class time. There were no points in the monitoring system for teaching by using the e-learning. Therefore, teachers were not interested on integrating e-learning in their teaching. It was reported during key informant interview:

> "These e-learning concepts are separated from teachers' Curriculum. Teachers are supposed to follow the syllabus and do exercises. That's only expected from teachers. If they are following these activities they're considered as extra activities, in tradition" (O_NP_P_7_)"

If teachers consider teaching by using e-lessons to be burden, it is very difficult to implement it at school therefore, teachers should get benefit through teaching by using e-lesson then other teachers did not teach with integrating e-lesson or during the class time. This was very important. One key informant mentioned that

> *"If there is an promotion to use e-learning and creating content they will do it (O_NP_Z_10)"*

If teachers feel that there benefit for them through teaching e-lesson. Not only promotion but also they got financial benefit from the school. They would work very hard. The school could not expect the teachers with any benefit. These practical issues should be considered to develop e-learning implementation policy. A experience IT directors expressed as follow

> *This is good for pay scale changes and they will do it if it helps the EB exam. I think they will not go for it if it is to develop them and teach their students (O_NP_Z_9)*

The efficiency bar exam could include the module relevant to e-learning. The teachers are very interesting learning the methods and techniques of e-learning. Further added by the long year experience Assistant Director expressed that: *" There should be a policy for everyone to buy the same smart books (O_NP_Z_10)*"

There should be clear policy at the provincial and national level to purchase equipment for teaching and learning through e-learning because different school purchased different equipment. It is very difficult for Zonal and Provincial Training programme. Therefore, there should be common policy

4.2.2 People in General Education

Data analysis reveal that individual/ people in the general education system play vital role on implementing e-learning at school level. In the general education system of Sri Lanka, it consists of students, teachers, principal and officers.

Principals' Characteristics

First, principals are very important for implementing e-learning. The principals' attitude, leadership and commitment are considered as important characterises. The principal's attitude toward e-learning implementation is crucial for teaching and learning at school level. One of experience participants state that

> *The principals think that e-learning is important for school then only they use the e-lesson in their classroom (O_M_1)*

Further he added that the principal's attitude is ICT only for ICT teachers, but these

concepts should be changed in general education system. It is time consuming effort. He noted:

If we conduct a workshop for teachers for ten days, we have to conduct a workshop for principals for twelve days, only then we can change their mindset of principal. Because if they find any digital tools it is only for ICT teachers, just for the ICT lab

Similar view expressed by the participants shared another experience of online programme. If the principals feel that it is good for their school and students. He noted

In view of administration side, there is high effort and cost at the initial stage on digital initiative. I realised the EMIS data base update last year the principals face difficulties to update the EMIS data base and there are facilities for schools to enter term marks and produce reports, but most the principals were relucted. Only ten principals agreed to do so. If the principals feel that the initiative support to their teachers and students then only, they do. We need to motivate and create principal's mind-set that e-learning initiative support students and teachers and increase quality of education (O_NP_P_7)

The principals' attitude plays important role to implement e-learning for teaching and learning at school level. According to the above participant statement, the principals' attitude needs to be changed and clearly give awareness on e-learning important and its benefit for students and teachers. In addition to this, the principals' leadership skill also influences on e-learning implementation.

The principals' leadership skill plays vital role in implementing e-learning in general education systems. The principals should have the capacities to identify the capabilities of teachers and then assigned the task. One of the key informants stated

We conducted ICT training programme for teachers to improve ICT skill. We send letter to principals to send appropriate teachers for the training programme. Some principals send teachers who never touch computer. It is very difficult for us to train these kinds of teachers. They were ideal during the training programme. After the training, she/he never practice at school, therefore, principals should have capacity to identify the capability of teachers O_M_1)

The principals should assign appropriate teachers for implementing e-learning at schools. It would be successful programme. Not only assigning suitable teachers but also principal should take necessary steps and measure to attract funding from suitable

sources and equip the schools. In addition to make available equipment and accessories, the principals should organize or send the teachers to training programme. One of the principals who implement e-learning programme through receiving fund from Old Students Association (OBA). He encourages the teachers to teach using e-lessons and give time for teachers to prepare lesson on their own and collect available lesson from the Provincial Department of Education. He stated that

> *I develop e-learning teaching and learning facilities in my own effort. There is no support from Zonal Education office or Provincial Department of Education. In the initial stage, I face difficulties to organize the facilities and teachers did not give full support, but they understood necessity of e-learning (P_NP_J_1)*

Teachers' Characteristics

The Data analysis from the key informant interview and focus group discussion reveal that the characteristics of the teachers play important role on implementing e-lerning at school. They are ground level implementors. They need to capacitated and motivated to improve quality of education. Their role was changed time to time based on the demand of education for job market. One of the key informants stated

> *Teachers should change role from teachers to facilitator. Now a days, teachers should play facilitate role. Then only, the implementation of e-learning would be successful at school level (O_M_1)*

Similar view expressed by experience Assistant Director of Education

> *The teachers should be willing to change their mind set. Even now teachers are interested on teaching in the traditional way. They face challenges to change their teaching methodology. But students are very interested on learning through innovate method. Even though, new teachers come to our zone they are also willing to teach what they already have. They are not interested to update them or create new e-learning content for their students (O_NP_Z_10)*

The teachers play vital role to implement the e-learning at school level. They need change their role. Not only changing role of teachers but also commitment of teachers also important.

Commitment

The commitments of the teachers are very important to improve quality of education at school level. Teachers are interested on traditional teaching and learning method but if school management want to change some changes in their teaching method. Their commitment automatically loses. One of principal from key informant interview stated that

> *"I started e-learning system at my own risk. At the beginning stage, there was no support from the teachers' side. Now there are 70 teachers in our school only four or five teachers use the e-learning system and SMART board. Teacher are willing to create new content and teach them. They are able to use available content"*
> *(P_NP_J_1)*

> Further, another principal expressed similar view:

> *"There is great benefit for teachers and students to implement e-learning system, but the teachers' level of involvement is very poor. There is a lot new update thing in modern education system. Teachers have to update and adopt new technology and provide new knowledge for their students (P_NP_Mu_2).*

Resistance to padegogical Change

The teachers are very interested on teaching and learning in the traditional method, but if school introduce modern initiative for teaching and learning at schools. The teachers are relucted to use IT equipment and they are not familiar with equipment. One of key informant interview stated

> *The teachers are fear to use multimedia because they do not know operation of multimedia and they fear to multimedia get out of order or under repair. These are government property therefore, they are fear of inquiry from the higher authorities (O_M_1)*

Further similar view expressed by the Assistant Director of Education.

> *The teachers are afraid of use the IT equipment. If they need to use it, they request ICT teachers to operate it. If ICT teachers are busy with their teaching, other subject teachers are unable to teacher e-lessons ((O_NP_Z_9)*

In contrast, Assistant Director of Education who was in charge for ICT expressed

> *Some teachers especially young teachers they sometime tend to e-learning facilities and they do like actually in e-learning. But there is another part of teachers they don't have that much of access of computers they don't have that kind of skills to use that one. So, they may have some problems (officersO_S_P_3)*

> *Not satisfied about the capacity of teachers sometimes newly appointed teachers or young generation they have the capacity but sometime they tend to do this that is the problem (O_S_P_3)*

Teachers work load

In the general education system, supervisor expect that teacher should complete the syllabus and documentary work properly. Therefore, teachers are not interested to follow modern technology because supervisor visit their classroom and checked weather the teacher complete the documentary work. One of the experience key informant interviewer stated that

> *Teachers are used to the traditional method of teaching and learning. They allocate time for doing documentary work. If the teachers take time to teach using e-lesson at the computer room, then they do not have enough time to complete documentary work. For example, one teacher who involve the extra curriculum work, did not finish their documentary work. One day our team visit the school and check the document of the particular teachers. Some of the document work was pending. Our team supervisor emphases on documentary work only. They did not consider about the other extra work. Therefore, teacher feel we complete our regular work. We need not go for additional work. They feel the e-learning used at classroom are additional work for them (O_NP_P_8)*

Similar view expressed by a participant

> *Teachers feel that development of e-lesson was big task and burden for them therefore, the education authorities should create appropriate contents for teachers (O_NP_Z_10)*

Teachers attitude

Teachers attitude play important role in e-learning implementation at school. One of the experience participant mention that

If education system introduces any modern system to school, the teacher feel weather there are benefits for them. If there are benefits or promotion then they are interested to implement particular project, therefore, the e-learning programme should be linked with benefits of teachers or promotion then only teachers work hard to achieve the success of programme (O_NP_P_8)

In contrast, one of the experience ICT officers stated that

Nowadays, new teachers are very interest on using modern teaching and learning programme during the internship period, but after they got appointment, they are relucted to do modern or innovative approaches in their classroom. I feel there are system error in our education administrative system.
O_NP_Z_9)

Similar view expressed by the one of the experience principals

There are fundamental issues on the e-learning implementation Most of the teachers in our school are not interest on implementing e-learning system. For example I asked one of the Tamil Language teachers to use e-learning system. That teacher responded how to teach Tamil language in SMART board (P_NP_J_1)

Further same principal added

One religion teacher asked me how to teach Hindu Culture in the e-learning system. I did not agree that there is modern system to use teaching all kind of subject. The teachers are not interest to learn modern technology for teaching and learning their subject. (P_NP_J_1)

Students' Characteristics

Successful implementation of e-learning at schools, the students are very important. The data analysis revealed that lack of students' interest, negative attitude on e-learning and miss usage of technology resources and student technical skill.

First, the lack of interest of students are crucial barriers to implement any programme. In the case of e-learning, students need to get quality of education and flexible learning environment. The students should be motivated to involve learning interesting, but some students are interested on learning.

Another principal stated

> *"The students score low marks in the examination. They are not interested on self-learning or e-learning. They need to be provided extra class in tradition method"*

In contrast, during focus group discussion in Southern province, teachers mentioned that

> *"Nowadays students are keen to learning innovate ways Students show very interest on learning through Multimedia and SMART board. Another teachers stated " I use multimedia for teaching Geography subject. Students come before bill ring for my subject period" and One Maths teachers also added students are curious in learning in innovative way maths. Nearly 80% of students have skills of operating computers and technology devices to access e-learning resources"(T_S_G_3)*

Students attitude

The negative attitude of students on digital learning lead big questions for students learning. One of the principals who implanting e-learning at school. He shared his real experience

> *One of my student request parents to purchase computer with internet connection to study and use e-lesson. The students told that his teacher instructed him to do homework by using computer. The parents purchased computer with internet connection. He learnt some IT knowledge. He involve in play Game. Now he did not study at night always playing Game. He also spent money also to challenge another competitor. Now He is very week in studies. Therefore, I request teachers do not give exercise to students to do at home by using computer. (P_NP_J_1)*

The data analysis show that people in the general education system play vital role in implementing e-learning but there are constraints and barriers. The characteristics of principals' influence in e-learning. In this study, negative attitudes of principal level of technical skill, lack of leadership skill level of commitment strongly influence on implementing e-learning. The teachers are crucial changes agent to take e-learning to general level. The studies revealed the characteristics: negative attitudes lack of restriction to change and training. Technical competencies restriction to change and training have impact on e-learning implementation in general education system. Another crucial factor in students' characteristics, Interest, attitude, Technical skill/

competency and parents support. These characteristics play vital role on source of e-learning.

4.2.3 Pedagogy

The choice of pedagogical model is believed to have effects on learning. the appropriateness of pedagogical models favours a move from a more instructor-centred approach to a learner-oriented approach where the students take ownership of their learning. Choosing a wrong pedagogy for an e-learning programme makes all the difference between success and failure of the implementation. The pedagogy may vary from programme to programme depending on nature of the content and level of difficulty. Not considering this well is actually planning to fail.

Data analysis reveal that pedagogy had impact on e-learning implementation programme in the school level in Sri Lanka. Further in the pedagogy included examination system, grading policy and subject content.

Examination systems

The examination system plays important role in implementing e-learning. Whatever attractive and efficient e-learning was created or available for students. The success or failure depends on the examination systems. One of experience participants from Central Ministry mentioned:

> *Other than the pedagogy, all officers at higher rank requests from teachers what is the pass percentage of your subject. They emphases that teachers give maximum level of effort to increase pass percentage therefore, we concentrate on pass percentage (O_M_1)*

Further added that

> *Because now I think the only thing that is a false hindrance to e-learning is the written exam system. Whatever teachers teach through e-learning systems, students should sit for written examination therefore, students are preferred to the traditional teaching method (O_NP_P_7)*

Similar view expressed by the participants

> *What it means is that the exam paper is self-written no matter how you study nationally. The practical will not be used unless the child has made an improvement in the digital medium of writing (O_NP_P_8).*

Local digital contents

This refers to what is actually being taught or learned. How interesting, relevant, accurate, up to date and in line with the needs of future employers go a long way to determine the successfulness of the e-learning implementation. Where students do not perceive or feel that the information being provided is useful, they would be discouraged from using the system and discourage future users. There is the need for the subject content to be relevant to the expectations of the students and future employers, else the implementation of the e-learning will not be successful.

During the focus group discussion, teachers expressed that

> *Everything goes in English. There is a model where we can put video to show the practical that cannot be done in Tamil (T_NP_M_1)*

Similar view expressed by the participants form Matara District

> *Curriculums are not available as enough. Mostly available for primary studies" (O_S_Z_4)*

Integrating IT teaching and learning

Information Technology (IT) play vital all the sectors. Therefore, the general education needs to be adopted IT into curriculum of Sri Lanka, but there are different opinion on it. The teaching and learning process should integrate with information technology. One of key informant suggested:

> *Top level people on the general education system think that ICT is separated subject. We need to integrate it into another subject. The students can learn separately. But students do not application of ICT on the subject matter. ICT is basement for teaching and learning other subject not separate subject (O_M_1)*

Similar view expressed by the Deputy Director of Education at provincial level in Southern Province

> *Learning models must be developed and change according to modern world requirements. Syllabus has been updated nearly so contents must be updated dynamically and develop teaching learning process innovative way." O_S_P_2)*

4.2.4 Resources in General Education
Finance Resources

The date analysis reveal that the finance is very crucial factors for implementing e-learning at schools. There was limitation for financial resources in general education system mostly at school.

One of the officers from the provincial Department of education stated that

> *School face big problems to pay electricity bill because of using computer for e-learning and teaching ICT. Normally If school use 40 computer and AC, school have to pay more than 15000 rupees. School do not have allocation for the payment. Therefore, school could not bear these big amount (O_NP_P_7).*

Similar view expressed by the Provincial level officer,

> *There is no dedicated budget allocation on this topic" (O_S_P_2). Actually separate budget from our individual budgets we annual plans to do this thing those budgets only we can need. No separate budget but we willing to have a separate one in implementing plans we include these things (O_S_P_3). Those things are the encouraging smart class rooms and sometimes the province. We try our best to we have limited budgets but if we get some budgets sometimes we do and try to establish those things (O_S_P_3)*

Further adding the similar view, one of the experience Assistant Director from Southern Province. He stated that

> *There is a major issue in budgetary allocations. There is no particular budget allocated under e-learning topic" (O_S_Z_4 A)*

The education system face difficulties not only financial resources but also human resource.

Human Resources

In the human resources management include availability of human resource: teachers, technical assistant, expert for e-learning development and implementing. Further, human resource management consist of training for teachers and students.

In the human resource, appropriate resource should be made available at school level otherwise, it is very difficult to implement e-learning. One of ADE (ICT) stated that

> *Some challenges are I discussed with you basic thing is lack of resources. That means human plus physical human also problem. we hardly find in teachers for subjects so these things they should be skill fully ICT and that knowledge in that case we have some resource problem in human*

Misuse of human resource

The human resources should be used effectively and efficiently, but the school administrative system use teachers who are specialist in the ICT field. They may be requested to do most of their time administrative work.

> *" As you know there are ICT teachers at school. The most of the principals requested them to do administrative work. For example they need to type letter and fill form. The sometime they may be requested to update Education Management Information System. Most of the time, ICT teachers are doing clerical work (O_M_1)*

Further added same participant

> *If we appoint a management assistant for this type of work. Teachers will help other course teachers. Because the teacher has to do both teaching and clerical work. They get tired when they do administrative tasks and can not help the teachers they work with. At that time the teachers would complain that the IT teachers were not helping us (O_M_1)*

In addition to these, the experience participant from Madhu Zone education office expressed

> *At the time the ICT teachers were appointed, all the principals give a lot of clerical and work and use them as clerks. Those who get rid of it are the ones who can talk frankly (O_NP_Z_10)*

Training

During the key informant interview and focus group discuss, the participant expressed that

> *" If there are problem during teaching at classroom there is no assistant to solve those problem. Only we believe our teachers. There is no expert in the Zonal Education office and Provincial Department of Education Office. Not only these issues but also there is no proper teachers professional development plan for developing e-learning and modern teaching and learning skill O_NP_P_7)*

Further he added

> *Without expert in the provincial and zonal education office, we depend on the suppliers who supplied the ICT equipment. The supplier take long time to solve the problem. The teachers can not teacher. These kinds of problem should be taken into consideration by the Provincial Department of Education*

In contrast, the participants from zonal level stated that

> *"No need of training for newly appointed teachers but old teachers need training (O_NP_Z_10)"*

Further, one of Assistant Director of Education expressed

> *The teachers were given training on ICT, but they did not know how to use their ICT knowledge on teaching and learning activities. The training programme should be designed to give hand on practical training. Then There should be monitoring system for teachers to closely monitor the teachers who got the training whether they applied during the teaching and learning process (O_NP_Z_9)*

Physical Infrastructure

The infrastructure plays important in implementing e-learning in the general education system. The most of the school set up suitable for traditional learning teaching activities. In the modern teaching and learning activities, appropriate infrastructure facilities were required by the school.

One of key informant participants

> *The existing infrastructure is not ready to spread the concept fairly"* *(O_S_P_2)*

> *"Infrastructure/equipment/e-learning unit/IT centre is a topic that we need to handle with a good vision. They are outdating faster with the time. A single implementation of ICT infrastructure is not suitable after few years. So If we are going to implement any infrastructure resources, they must be planned by considering situation after few years forward" "The existing infrastructure is not enough to fulfil existing requirements and utilize existing human resources" (O_S_P_2)*

Similar view expressed the experience participant at provincial level

> *So in our side we try our best to provide enough facilities to school to using this thing and all. But sometimes we don't have that much of resources but in the limitation, we try our best to include those facilities. (O_S_P_3)*

One of key informant interviewee who was from Mullaitivu District stated:

> *My school is seen as a school that normally has no space for the classroom. If the appropriate facilities and stations are available, we will additionally teach this method of teaching Science Mathematics English (P_NP_Mu_2) For us the classroom is still a temporary when viewed with other places. If resources are available it will be welcome and supportive (P_NP_Mu_2)*

During the focus group discussion with teachers' group, a teacher stated:

> *"We have no electricity supply for our classrooms" "Existing classroom structure is not ready for that" (T_S_G_3) Classroom should be full covered one so that other classes won't disturbed by the noise"* Other teachers mentioned *"To make it within the classroom, a big infrastructure improvement is required. Existing structure of classrooms is not suitable to implement e-learning facilities" (T_S_G_3)* Another focus group discussion teachers stated *"Classrooms are not with electricity supply. So we can't use multimedia projectors and any electronic devices there" (T_S_G_4)*

The resources play important role in implementing e-learning. Lack of budget particularly for e-learning and over expenditure are limited implementation in general education system In addition human resources is critical factors lack of expert LMS, Lack of supporting staff, poor management of staff and lack of professional development on e-learning. These characteristic human resource influence on e-learning. The physical resource also has an impact on implementation of e-learning. The lack of building facilities, Lack of separate digital classroom and lack of equipment and accessories were barrier for effective implementation on e-learning.

4.2.5 Technology

Analysis of the data in this study reveals that a range of technological factors have impact on implementing the e-learning at school level in Sri Lanka. These factors are

hardware facilities, IT resources management, IT resource maintenances, Software availabilities, technical infrastructure and Technical issues.

Hardware Facilities

The implementing e-learning at schools' level in Sri Lanka, the hardware facilities play importance role. Without proper hardware at school are very difficult to implement e-learning. But, in the Northern Province in popular 1AB School there was no computer facilities reported as follow:

> *"If you've seen Ramanathan College next to us, it's a 1AB school, but the school didn't have a computer. There are seven hundred children who have no computers. and A/L, O/L ICT subject is being taught from there, but there are not enough computers to do practical (O_NP_P_8)"*

The computer is basic requirement for implementing e-learning, but there was no computer even the 1AB School in Jaffna District. It is very pathetic situation for starting e-learning like these schools. Further added one of the key informant interviewers as follow:

> *One project gave 10 laptops to Avarangaal Mahajana School. But they are weak in physical resources. They can do it If it can be fixed . Colombothurai Hindu is 1 C School There is only one computer O_NP_Z_9.*

Not only computer but also the other accessories such as Multimedia also was importance for e-learning. One of the educationists working in the Provincial Department of Education Northern province state that

> *"Four hundred of the 550 schools are non-multimedia schools. Multimedia is a twenty-five-year-old technology through which we can show and explain everything (O_NP_P_7)"*

Not only Northern Province but also in the Southern Province also same situation, the educationist in the Southern province expressed as

> *Due to less resources if say in schools they have only one computer lab one multimedia the one teacher can use that they don't have preparations they don't have private laptops and all. For all the lessons they have to go for labs they should have free time they have those facilities those are the restrictions some time they have the capacity everything is that other than the that they don't have enough explosion resources. (O_S_P_3)*

Effective implantation of e-learning, schools should be properly equipped with all necessary accessories. One of the principals from Jaffna District expressed as follow:

> *Give not only computers but also some other tools like Document Camera, its a good thing to do. It will only grow if a teacher is willing to do all this in government. (P_NP_J_1)*

IT Resource allocation and maintenance

Data analysis revels that the IT resources allocation and management have effect on implementing e-learning at school, therefore it should be allocated effectively and efficiently through proper mechanism. The during the key informant interview, the experience and implementing e-learning programme in national level expressed as follow

> *"Children studying ICT as a subject are between 10-20. But they have 60 computers at Lab. It is used only for ICT. But it has to change completely. ICT Lab will be used for all subjects………… In some schools there is a Mahinda Udaya Lab and it is only for ICT (O_M_1)*

The above evidence indicated that the principals and monitoring officers from Zonal and Provincial level are lacking behind the purpose of the IT lab, further, the similar concern expressed the officer who was in charged for implementing e-learning at provincial level as

> *Establishing IT in an IT lab is not just for IT subjects but for other subjects as well. The purpose of IT is not just to teach IT. Purpose is divide IT into three ICT education, education in ICT, education for ICT. We have only the first part of it. Only the first part is in a little condition. If they had built an ICT building that everyone's opinion would be for ICT only (O_NP_P_7).*

Further evidence given by the focus group discuss among teachers said

> *It will be easier to teach if the school provides separate unit with internet facilities. Everyone can do according to the schedule. Because when I go to an IT lab to teach using multimedia, it feels like a confusing time between IT teacher. A place that is generally for e-learning for everything and they must have one computer, projector and a router (T_NP_Mu_2)*

Another focus group teachers in Mannar District stated

> *Yes, can go to the IT lab with the kids. You can go to the lab whenever there is no class (T_NP_M_1)*

Further pointed out by the director from the Northern Province. The some school have computer lab with all facilities, but they face difficulties for maintaining the computer and equipment proper because the annual allocation for the particular schools are very limited said:

> *The school does not have all the facilities. For example, if we say that the number of computer labs provided to government schools is forty, it will be difficult to maintain those forty computers. If those schools could not handle it, the government didn't take action to maintain it.(O_NP_P_8)*

Similar view expressed by the participants from the Southern Province

> *At the moment they have some problems for maintenance and all so it should be a continuous process if we get some breakdowns, we will have the regular planning for maintain otherwise the schools are in a problem because they don't have the amount to maintain. Example these days they are trying to implement it online exam so that one most of the time we have some selected centres in our province but most of them are mahinda uthaya computer labs in those labs we had some problem with computers networks problems so we have agreement with this company we have signed they should prepare the computers these days there is a lack of staffs in company so process is very slow. Although we contact people to come and repair it it's a very slow process so we have some problems. O_S_P_3*

Tech Infrastructure

Technical infrastructure is very important to easily implement the e-learning at school level, but there were many school in Northern and Southern Province face difficulties to access proper infrastructure facilities due to lack of funding and one of participants from Northern Province mentioned as follow:

> *The reason why ICT teachers are increasingly used is because of the practicals available. The other is that we don't have enough tools. If you look at some places, there is a school they don't have money to get it on the internet So with such problems that is impossible to take this there fore they use traditional method of teaching using existing content (O_NP_P_8)*

> *"There is a big lack of infrastructure in remote areas"*
> *"That is why we are having troubles on conducting GIT exams online"*
> *(O_S_Z_4)*

One of the principal mentioned that

> *The first place to set up e-learning is to set up a facility. Schools under this zone where classrooms are not adequate should set up a laboratory for e-learning as a science laboratory and a laboratory for information technology(P_NP_Mu_2)*

Technology were vital for implementing e-learning in general education but There were lack of computer and accessories, poor maintenance of IT resources and Technological infrastructure. These barriers are limiting the e-learning implementation.

4.2.6 Institution of General Education System

There are hierarchy of Institutes which monitor and strengthening the function of schools. In Sri Lanka, Central Ministry of Education, Provincial Ministry of Education, Provincial Department of Education, Zonal Education office, Divisional Director office are hierarchy institutes for monitoring and supporting function of schools effectively and efficiently.

Under the central Ministry of Education, there are branches for each function with full staff. They monitored effectively, but the e-learning case, there was no separate branch there was a unit under IT branch. It was clearly mentioned by the experience participant in e-learning and working as co-ordinator for e-learning at provincial level and national level.

> *There is a branch under the IT branch where policy is not well defined at the national level. First its name is E- Thakasalawa and now it changed as Nenasa branch. Nenasa educational telecasting and e-learning branch is not a branch but a unit under the branch. It operates on a large scale, a small unit under the IT branch. They put together four officers under four SLAS officers and make a web system that conducts the learning process(O_NP_P_7)*

This was functioning unit at national level for supporting and developing the e-lesson and uploading E-Thaksalawa website. National level unit need to be strengthened and it should coordinate all province to implement e-learning effectively and efficiently. One of the key informant participant from the Matara District expressed as follow

"Some of our teachers are committing on creating contents e-Thaksalawa but they are directly relating with ministry. That unit provide training for teachers who are interested on creating content for e-Thaksalawa programme. They did not provide training for teachers who teach at classroom. It is very important that Central ministry should give training for teachers to use e-learning method at schools" (O_S_Z_4)

Institutes for teacher professional development

The first, we should start from the National College of Education (NCOE). Trainee teacher should be trained on the e-learning system an usage of digital contents. They should give training using e-Thaksalawa Learning Management System. National College of Education encourage should encourage trainee teachers to develop e-lessons for their subject, then they pass out from college, they can use it in their classroom. Further during the training period also they can use it (O_M_1)".

Further added by the principal .

It would be nice if you could bring this to the College of Education. Now young teachers are good at computer literacy. The reason for the presence of young teachers is bringing e-learning to future teachers (P_NP_J_1)

The same principal stated

Now also, trainee teachers come from College of Education during the training period, they come with teaching aid as bristle board drawing picture and prepared teaching aid by using bristle board. Now we expect trainee teachers should come with presentation or e-lesson of the subject. But making teaching aid using bristle board was old fashion. When I was a trainer I took bristle board as teaching aid. We did not change our teaching methodology even now. In the digital world, we used bristle board for explain subject matter with black board and bristle board (P_NP_J_1)

Provincial Ministry of Education and Department of Education

The Provincial Administrative System play vital role on developing and providing quality education for students in the Province. In the case of the e-learning implementation, there should be proper equipment Branch with expert staff. One of the experience principal who implemented e-learning system at his school said that

There was no proper e-learning system in our province. They need to establish a unit at provincial level and provide equipment for producing e-lesson and

staff need to be developed that unit coordinate with zonal level and implement programme. There is no proper set up at Provincial level (P_NP_Mu_2)

Similar view expressed by the experience participants

The officer should be assigned particularly for e-learning program with all with all facilities required for implementing e-learning effectively. There should be staff with capacity software and hardware technical skill. There is no expert team at provincial level for providing training on digital content development and monitoring e-learning implementation properly (O_NP_P_7)

Not only establishing and strengthen unit at Provincial level but also the Provincial Department of Education should strengthen the monitoring system and integrated the e-learning module into the monitoring tool. One of the participants expressed

There is no monitoring system at provincial level. For example, If I was teacher, I did what expectation of supervisor or monitoring officer. I did not go further with their permission. There is no guideline to monitor e-lesson implementation at Provincial level. There is no even circular for monitoring e-learning (O_NP_P_7)

We use external evaluation guideline for monitoring quality of education of school, which is not include the e-learning monitoring tools. Therefore, teachers are not interested on e-learning.

Similar view expressed by the experience Assistance Director from the Southern Province

Once a Science textbook released in digital way. By publication department. It came as a pilot project. We have delivered those CDs among schools but no measurement or idea whether it is used in schools or not." O_S_Z_4)

Provincial Level Training Programme

The training methodology and need for training need to be identified and provide training for provincial level expert staff and provide foreign exposal visit to improve

the capacity of staff who were working at Provincial level. One of the participants stated

> *I visited school for monitoring. There are facilities at school for teaching using digital content and multimedia. Most of teachers told that they did not know how operate basic tool of e-learning system (O_NP_Z_11)*

Further, another participant from Southern Province

> *"There may have been conducted few training programmes for teachers regarding smart classroom activities but they are not in zonal level. (O_S_Z_4)*

Similar view expressed by experience Deputy Director of Education

> *"Some of subject directors have been trained regarding utilizing e-learning capacities for their subjects. But everyone has not been covered" "Training programmes don't lasts continuously. Mostly they are disappearing after one or two steps" (O_S_P_2)*

Zonal level factors influencing on e-learning in general education

The monitoring at school was very vital for enhancing quality of education. In the case of e-learning, there are lack of monitoring mechanism. One of participants stated:

> *Zone education office does not have team for monitoring e-lesson. Even there is no single person. Only they monitor subject matter. They never consider whether school implement e-learning programme not. (O_NP_P_7)*

The monitoring system should be developed by each zona for implementing e-learning at schools. There is lack of guideline principles for monitoring schools. Further key informant interviewee stated:

> *Zonal level team visit school, but they did not take care of e-learning. There is no proper monitoring guidelines for e-learning. There is no officers assigned particular for e-learning (O_S_P_2)*

The effective implementation of e-learning at school level will be determined by effective zonal monitoring and providing guideline for school. But in the case of e-learning, one participant mentioned that

> *There is no technical expert for e-learning at zonal level , but there are hardware team. They visit school only , principal complain the issues of computer (O_NP_Z_11)*

In the general education system, the government prepared guidelines and circular for any initiative. But there is no single circular for e-learning. One of key informant interviewee stated:

> *There is no circular regarding e-learning implementation at zonal level. If there is proper circular/guidelines the teachers do properly. Otherwise, it is very difficult for principals to request teachers to do it. (O_S_Z_4)*

The interviewee emphases that absence of division of e-learning at national level and provincial level There was no experts particularly instruction designer, content developer interface designer and LMS administrator. Further, Provincial level also there are absent of expert staff at provincial level. There were no monitoring mechanism or guidelines for monitoring e-learning in general education system. The professional development Institute for teacher did not integrate modern technology into curriculum. Now also these institute give traditional method of training

Factors	Sub factors
Policy	National Level Policy Provincial Level policy Policy integrate promotion of teacher Policy integrate with benefit of teacher Strategies plan at national and provincial
People	**Principal** 1. Attitude 2. Teachers competency 3. Leadership 4. Commitments 5. Acceptance **Teachers** 1. Attitude 2. Commitment 3. Work Load 4. Technical competency 5. Resistance to pedagogical change **Students** 1. Attitude 2. Technical competency / skill 3. Parents support 4. Training 5. Time

Pedagogy	Examination System Digital content availability Integrating IT in teaching and learning

Resources	**Financial Resources**
	  1. Funding
	  2. Separate budget expenditure
	Human resources
	  1. Expert resource person
	  2. Supporting staff
	  3. Staff management
	
	Physical Resources
	  1. Infrastructure
	  2. Equipment
	  3. Facilities

Technology	Hardware Software Maintenance of IT resource Utilization of IT resource Technology infrastructure

Institutions	**National Level Institution**
	  1. Ministry of Education
	  2. Institute for teacher's profession development
	    Hardware
	      1. Availability and maintenance
	      2. Utilization
	    Software
	      1. Availability
	      2. Maintenance
	      3. Utilization
	    Technology infrastructure
	      1. Availability
	      2. Maintenance
	
	Provincial Ministry/ Provincial Department of Education
	  1. Assigned officers
	  2. Resource Team
	  3. Monitoring Mechanism
	  4. Training
	
	Zonal Education Office
	  1. Assigned Officers
	  2. Resource Team
	  3. Monitoring Mechanism
	  4. Training

4.3 Readiness of Northern Province for e-learning

4.3.1 Students Readiness towards e-learning

4.3.1.1 Students attitudes towards e-learning

Table 4.1 Students readiness towards e-learning

Factors	N	Mean	Std. Deviation
My students have knowledge on e-learning	55	3.07	0.9
My students find it easy to use e-learning	55	3.29	0.936
Students believe that e-learning is beneficial to them and that is necessary for this time.	55	2.29	0.956

As can be seen from the table 4.1, means scores for students' attitudes towards e-learning is not only lower than the expected readiness level (M_o = 2.6) but also lower than 2.6. It means, the students' attitudes towards the readiness for e-learning is not so far from being satisfactory. These findings indicate Students need some more interests in e-learning then they will love it and think that learning through e-learning will be easier for them.

Students Technical Competency

Table 4.2 Students use of Technology Readiness

Factors	N	Mean	Std. Deviation
Students know the basic functions of computer hardware components (CPU and monitor) including its peripherals like the printer, speaker, mouse etc	55	2.87	1.055
Students know how to turn on and shutdown the computer properly	55	2.45	1.102
Students know and find it easy to use web browsers and emails.	55	3.22	1.031
The students can find it easy to type using computers	55	3.24	0.999
The students are able to type their own language correctly	55	3.67	0.982

As can be seen from the Table 4.2, Mean scores of items for using Internet as an information source, using e-mail to communicate and using office software are not only higher than the expected readiness level (Mo = 2.6) but also higher than 2.6 which means, the readiness for these sub factors are insufficient for e-learning. Students have sufficient knowledge to switch on and off computers they need more attention to use type their own language correctly. use of technology readiness indicate the mean scores higher than the expected level which prove there is a

shortage and insufficient readiness among students for e-learning programs. There fore students need to be trained before launching e-learning.

Availability of training, support and time for students

Table 4.3 Availability of training, support and time for students

Factors	N	Mean	Std. Deviation
Students have attended seminars/ workshops related to e-learning activities	55	3.73	0.932
The parents of my students support the use of e-learning at home	55	3.18	1.038
My students are capable to manage their time well in e-learning	55	2.96	0.981

As can be seen from the Table 4.3, Mean scores of students and parents need training and supportive seminars to learn through e-learning because their readiness for e-leaning mean value is Higher than 3.4.Students wish to study through e-learning. they are young and more interested in using new technologies They need to be worked on and opportunities should be provided them to improve these weak points.

4.3.1.2 Teachers Readiness towards e-learning
Teachers attitude towards e-learning

Table 4.4 Teachers attitude towards e-learning

Factors	N	Mean	Std. Deviation
Teachers are very clear about what is e-learning.	55	2.42	0.854
Teachers believe that e-learning is helpful to improve teaching and learning	55	1.93	0.858
Teachers are ready for integrating e-learning in their teaching	55	2.22	0.956
Teachers believe that e-learning is beneficial to students and is essential for this time.	55	1.78	0.762

As can be seen from the table 4.4, teachers attitudes toward e-learning is below the average level of 2.6. They are ready and prepared to teach through e-learning. Teachers think that e-learning is very useful thing to teach it will attract the students to study and students will study well through the e-learning method of teaching. It's a good idea to improve their teaching skills.

Teachers Technical Competency

Table 4.5 Teachers readiness towards Technology

Factors	N	Mean	Std. Deviation
Teachers know the basic functions of computer hardware components (CPU and monitor) including its peripherals like the printer, speaker, mouse etc	55	2.51	1.502
Teachers know about MS office /word processing and use it comfortably	55	2.45	1.051
Teachers know how to use presentation software (Software: PowerPoint) effectively	55	2.84	0.898

As can be seen from the table 4.5, When we investigate teacher's technology readiness towards e-learning, the computers basic functions and its components means value of them are below the average mean value 2.6. The teachers use word processing software in a comfortably manner that's ok the mean value of it is 2.45. The usage of presentation tools like PowerPoint is above the level of average 2.6 so they need more attention to improve it to teach through the presentation software.

Teachers Commitments towards e-learning

Table 4.6 Teachers Commitments towards e-learning

Factors	N	Mean	Std. Deviation
Teachers are dedicated to use technology for teaching and learning at the school level	55	2.35	0.821
Teachers have attended seminars/ workshops related to e-learning activities	55	3.02	0.952
Teachers were trained on the design and use of e-learning in the classroom	55	3.51	0.9

From the table 4.6, the teachers can see the obligations for e-learning. They are ready to use technology for teaching and learning at the school level, for which they need little improvement. Teachers' interests are not ready to participate in seminars and training-related e-learning activities, which require some more attention because the expected value level is higher than the average level of 2.6.

4.3.1.3 Principal Readiness towards e-learning

Table 4.7 Principals acceptance Readiness

Factors	N	Mean	Std. Deviation
I am keen to prepare e-learning material	55	1.62	0.623
I hope that e-learning enhance the quality of learning and teaching in my school	55	1.44	0.536
I hope that using e-learning can increase productivity of school	55	1.45	0.538
I hope that e-learning enables school to accomplish teaching more effectively than the traditional classroom based approach	55	1.47	0.604
I hope that implementation of e-learning will be easy at my school.	55	2.33	0.963
I support implementation of e-learning in my school in an effective manner.	55	1.84	0.788

When we investigate principal acceptance readiness we see that generally they show their acceptance of e-learning. Mean Value of 1.62 Pricipals are keen to prepare e-learning materials. Mean Value between 1.44 to 1.47 believe that e-learning can enhance the quality of their teaching, the quality of theoretical or practical parts of their subject and increase their productivity. Mean Value 2.33 believe that students find it easy to use e-learning and will like it.

Principals responses show that they believe that e-learning enables them to accomplish their teaching more effectively than the traditional classroom-based approach also they think e-learning help them to increase their productivity and quality of their teaching.

4.3.1.4 Institutional Readiness towards e-learning

In this part it covers provincial level institutional readiness, Zonal Level readiness and school level readiness in Northern Province

School management Readiness for e-learning

Table 4.8 School management readiness for e-learning

Factors	N	Mean	Std. Deviation
Our school encourages teachers to engage in teaching by using modern technology	55	2.22	0.854
There is committee involving directly to implementing e-learning at schools level	55	2.93	0.959

	55	2.56	0.834
The school is willing to provide a professional support system is in place to ensure teacher success in delivering the e-learning approach.	55	2.56	0.834

As can be seen in the table 4.8, the readiness of schools for e-learning encourages teachers to use modern technology and requires teacher-enhanced improvement in providing e-learning approach, but adequate at the school level. Team involvement in the e-learning process requires more attention. Mean value of team involvement is greater than 2.6

Policy and strategic planning towards e-learning

Table 4.9 Readiness Policy and strategic planning towards e-learning

Factors	N	Mean	Std. Deviation
An e-learning initiative is aligned with the our school's mission	55	2.58	0.975
The school has strategic plan for implementing e-learning in future	55	1.95	0.803

As can be seen in the table 4.9, the e-learning initiative is linked to the work of schools and the school has a strategic plan to implement e-learning towards schools in the future, but some improvements are needed.

Finance and Human resources Readiness of school

Table 4.10 Finance and Human resources readiness of schools

Factors	N	Mean	Std. Deviation
The school has financial capacities to implement e-learning	55	3.53	0.9
The school is willing to create annual budget for implementing e-learning	55	3.22	0.956
The school has experienced teachers who are able to provide trainings on e-learning for co-teachers	55	2.75	1.075
The school has adequate teachers to support an e-learning initiative	55	2.65	1.004

As can be seen in the table 4.10, financial capacities to implement e-learning and annual budgets for implementing e-learning needs lots of work. Mean value of Finance resources are more than the average (3.4 < = 5) The teachers in the schools to support e-leaning is sufficient.

Technical Resources Readiness of School

Table 4.11 Technical resources readiness of schools

Factors	N	Mean	Std. Deviation
The current technological infrastructure is adequate to build and/or sustain an e-learning environment	55	3.15	0.989
The school ensure availability of physical resources and equipment for teaching and learning through e-learning at classroom.	55	3.27	0.849
The school is willing to provide students and teachers access to appropriate hardware and software needed in the e-learning implementation	55	3.04	0.922
The school has a well-developed technical infrastructure to support the implementation of e-learning	55	3.4	1.029
The school has enough internet bandwidth. Neither students nor teachers complain about internet speed. Adequate and timely support is available at school to the teacher and students when technical issues arise	55	3.31	1.086
Connection speeds are sufficient for communication and accessing all course materials.	55	3.24	1.232
Teachers have adequate IT facilities to prepare e-lessons	55	3.29	0.956
The hardware (Hardware- computers and accessories) facilities of my school are enough for students and teachers	55	3.65	0.907
The software facilities of my school are enough for student and teacher	55	3.58	0.975
Teachers and students have access to computer whenever they need at school	55	3.15	1.145

As can be seen in the table 4.11, In the technical resources Hardware and software availability in the school level is critical and necessary for e-learning. Need to work on that to provide opportunities to get it. Other resources are little enough but need some works to improve it.

Schools Management Committee towards e-learning

Table 4.12 Schools Management readiness towards e-learning

Factors	N	Mean	Std. Deviation
School management committee knows what is e-learning and its impact on teaching and learning	55	2.62	0.952
School management committee support the use of e-learning in teaching and learning at classroom	55	2.42	1.031

School management committee members has participated workshop on e-learning designing and implementation in schools	55	3.35	1.04
We share document and information by email or Viber group/Whatapp among teachers	55	2.6	1.099

As can be seen from Table 4.12 , mean scores for School Management committee readiness are not only lower than the expected readiness level (= 2.6) but also higher than 2.6. It means, the institutional readiness for e-learning is far from being satisfactory and needs a lot of work .These findings indicate that there is lack of infrastructure and facilities are not sufficient to implement e-learning. Therefore, they should identify proper strategies to improve facilities and solve related problems before embarking on e-learning.

4.3.1.5 Zonal Education office Readiness

Human resources, Finance & Technical resources

Table 4.13 Human resources , Finance and technical resources in the zonal level

Factors	N	Mean	Std. Deviation
Zonal Education Office is willing to provide a professional support system is in place to ensure teacher success in delivering the e-learning approach.	55	2.85	0.731
The Zonal Education Office is financially ready to venture into e-learning implementation	55	2.93	0.813
The Zonal Education Office has experienced resource persons, or a unit that organizes trainings related to e-learning.	55	2.69	0.9
The Zonal Education Office is willing to provide students and teachers access to appropriate hardware and software needed in the e-learning implementation	55	2.82	0.748

As can be seen from the table 4.13, some more work is needed for zonal level readiness towards e-learning through human resources, financial resources and technical resources. This means that preparedness at the zonal level for e-learning is far from satisfactory and requires a lot of work. These findings indicate a lack of infrastructure at the zonal level.

Policies and monitoring Readiness

Table 4.14 Policies and monitoring level in the zonal level

Factors	N	Mean	Std. Deviation
Zonal Education Office has included e-learning implementing in external evaluation	55	2.71	1.048
Zonal Education Office has a plan for e-learning in the coming future	55	2.78	0.786

As can be seen from the table 4.14, some more work is needed for Zonal-level readiness for e-learning for policies and monitoring. Average values greater than the mean value of 2.6 and not higher than the value of 3.4.

4.3.1.6 Provincial Level Institutional Readiness

Policies , Strategic Planning & Monitoring

Table 4.15 Policies , Strategic Planning & Monitoring in the provincial level

Factors	N	Mean	Std. Deviation
The Provincial Ministry of Education has a systematic policy of implementing and monitoring e-learning.	54	2.39	0.979
The Provincial Ministry of Education is considered e-learning an important approach for teaching and learning.	55	2.11	0.875
The Provincial Department of Education has a strategic plan to implement e-learning	55	2.55	0.715
The Provincial Department of Education is monitoring the implementation of e-learning	55	2.89	0.712

Investigate the policies , strategic planning and monitoring of e-learning in the provincial level in the table 4.7, the policies and strategic planning are sufficient not only higher than the expected readiness level (= 2.6) but also lower than 2.5 which means, the readiness for these sub factors are highly sufficient for e- learning. However in the monitoring part the mean scores are more than 2.6 which indicates these sub factors need improvement.

Finance and Physical Resource Readiness

Table 4.16 Finance and Physical resources in the provincial level

Factors	N	Mean	Std. Deviation
The Provincial Ministry of Education is making an annual allocation for e-learning.	55	2.75	0.985
The Provincial Ministry of Education allocates the necessary physical resources and equipment for e-learning.	55	2.96	0.816

As the physical resources and the financial resources are limited in the provincial level according to the table 4.8, some more work is needed to implement e-learning. Means value of resources are above the level of average mean value.

Human Resource Readiness

Table 4.17 Human resources in the provincial level

Factors	N	Mean	Std. Deviation
There is an officer in charge of implementing and monitoring the e-learning in the Provincial Ministry of Education	55	2.65	1.022
The Provincial Department of Education encourages teachers and principals interested in learning new technology-based learning systems	55	2.58	0.875
A group/unit under the Provincial Department of Education is carrying out the initiatives efficiently for implementing e-learning	55	2.69	0.742
The Provincial Department of Education has specialized resource persons to provide training on e-learning.	55	2.44	0.764

As can be seen from the table 4.9, human resources are limited to implement e-learning at the provincial level and they need some more resource persons to develop e-learning. Improvement is needed especially on initiating e-learning readiness mean score is $(M = 2.6 < = 3.4)$

4.3.2 Readiness of Southern Province for e-learning

4.3.2.1 Students Readiness towards e-learning

Table 4.18 Students attitudes towards e-learning

Factors	N	Mean	Std. Deviation
My students have knowledge on e-learning	69	3.28	1.259

	N		
My students find it easy to use e-learning	69	3.93	1.005
Students believe that e-learning is beneficial to them and that is necessary for this time.	69	2.52	1.158

As can be seen from the table 4.18 means scores for students attitudes towards e-learning is higher than the expected readiness level ($M_o = 2.6$) but also lower than 4.2. It means, the students attitudes towards the readiness for e-learning is far from being satisfactory. Mean value for use of e-leaning are higher than the average level ($3.4 <= 4.2$) These findings indicate Students need some more interests in e-learning then they will love it and think that learning through e-learning will be easier for them

Students Technical Competency

Table 4.19 Students use of Technological Readiness

Factors	N	Mean	Std. Deviation
Students know the basic functions of computer hardware components (CPU and monitor) including its peripherals like the printer, speaker, mouse etc	69	3.06	1.293
Students know how to turn on and shutdown the computer properly	69	2.45	1.170
Students know and find it easy to use web browsers and emails.	69	3.68	1.118
The students can find it easy to type using computers	69	3.64	1.175
The students are able to type their own language correctly	69	3.83	1.175

As can be seen from the table 4.19, It is difficult for students to use computer components, turn on and off computers therefore they need more attention toward the training to develop their technical skills in the new technology. Mean scores of items for using Internet as an information source, using e-mail to communicate and using office software are higher than the expected readiness level ($M_o = 3.4$) which means, the readiness for these sub factors are insufficient for e-learning. Students and Parents are not interested to develop e-learning because their readiness for e-leaning mean value is in higher level ($M_o = 3.4 < 5$).They need to act and be given opportunities to improve on some weak points

Table 4.20 Availability of training, support and time for students

Factors	N	Mean	Std. Deviation
Students have attended seminars/ workshops related to e-learning activities	69	4.25	.961
The parents of my students support the use of e-learning at home	69	4.01	.993
My students are capable to manage their time well in e-learning	69	3.94	1.097

4.3.2.2 Teachers Readiness towards e-learning

Teachers Skills and Teachers attitude towards e-learning

Table 4.21 Teachers Skills and Teachers attitude towards e-learning

Factors	N	Mean	Std. Deviation
Teachers know the basic functions of computer hardware components (CPU and monitor) including its peripherals like the printer, speaker, mouse etc	69	3.09	1.108
Teachers know about MS office /word processing and use it comfortably	69	3.13	1.224
Teachers know how to use presentation software (Software: PowerPoint) effectively	69	2.96	1.035
Teachers are very clear about what is e-learning.	69	2.74	1.120
Teachers believe that e-learning is helpful to improve teaching and learning	69	2.25	1.063
Teachers are ready for integrating e-learning in their teaching	69	2.45	1.092
Teachers believe that e-learning is beneficial to students and is essential for this time.	69	2.09	1.040

As can be seen from the table 4.21, When we investigate teachers readiness and skills towards e-learning, They are slightly clear about e-learning, regarding the computers basic functions and its components and the usage of software for presentations are more than the average mean value 3.4. The teachers use word processing software in a comfortably manner that's ok but the mean value of their readiness is above the average value 2.6. The attitudes towards e-learning how to improve e-learning. How to integrate e-learning with their teaching method are in the lower level they need lots of work to improve it.

Teachers Commitments

Table 4.22 Teachers commitments

Factors	N	Mean	Std. Deviation
Teachers are dedicated to use technology for teaching and learning at the school level	69	2.96	1.077
Teachers have attended seminars/ workshops related to e-learning activities	69	3.43	1.242
Teachers were trained on the design and use of e-learning in the classroom	69	4.03	1.137

As can be seen from the table 4.22 teachers' commitments to e-learning is not adequate. Mean value of it is higher than average value 2.6 and lower than the mean value 3.4. But they need some works to improve the technology in the teaching method mean value of use of technology is higher than the average level 3.4. and Training is needed to design a classroom for e-learning.

4.3.2.3 Principal Readiness towards e-learning
Acceptance of principals

Table 4.23 Acceptance of principal

Factors	N	Mean	Std. Deviation
I am keen to prepare e-learning material	69	1.49	.504
I hope that e-learning enhance the quality of learning and teaching in my school	69	1.46	.531
I hope that using e-learning can increase productivity of school	69	1.42	.526
I hope that e-learning enables school to accomplish teaching more effectively than the traditional classroom based approach	69	1.43	.581
I hope that implementation of e-learning will be easy at my school.	69	2.04	1.206
I support implementation of e-learning in my school in an effective manner.	69	1.61	.752

As can be seen from the table 4.23, When we investigate principal acceptance readiness we see that generally they show their acceptance of e-learning. Mean Value of 1.49 Pricipals are keen to prepare e-learning materials. Mean Value between 1.42 to 1.46 believe that e-learning can enhance the quality of their teaching, the quality of theoretical or practical parts of their subject and increase their productivity. Mean Value 2.04 believe that students find it easy to use e-learning and will like it.

Principals responses show that they believe that e-learning enables them to accomplish their teaching more effectively than the traditional classroom-based approach also they think e-learning help them to increase their productivity and quality of their teaching.

4.3.2.4 Institutional Readiness towards e-learning

In this part it covers provincial level institutional readiness, Zonal Level readiness and school level readiness in Southern Province

Policy and strategic planning towards schools

Table 4.24 Policy and strategic planning towards schools

Factors	N	Mean	Std. Deviation
An e-learning initiative is aligned with the our school's mission	69	2.90	1.202
The school has strategic plan for implementing e-learning in future	69	2.87	1.056

As can be seen in the table 4.24, the e-learning initiative is linked to the work of schools and the school has a strategic plan to implement e-learning towards schools in the future, but some improvements are needed.

School Management readiness for e-learning

Table 4.25 school management

Factors	N	Mean	Std. Deviation
Our school encourages teachers to engage in teaching by using modern technology	69	2.71	1.189
There is committee involving directly to implementing e-learning at schools level	69	3.77	1.087
The school is willing to provide a professional support system is in place to ensure teacher success in delivering the e-learning approach.	69	2.88	1.195

As can be seen in the table 4.25, the readiness of schools for e-learning encourages teachers to use modern technology and requires teacher-enhanced improvement in providing e-learning approach, but not adequate at the school level. Committee

involvement in the e-learning process requires more attention. Mean value of team involvement is greater than 3.4

Finance and Human resources

Table 4.26 finance and human resources in school level

Factors	N	Mean	Std. Deviation
The school has financial capacities to implement e-learning	68	4.15	.902
The school is willing to create annual budget for implementing e-learning	69	3.65	1.211
The school has experienced teachers who are able to provide trainings on e-learning for co-teachers	69	3.42	1.193
The school has adequate teachers to support an e-learning initiative	69	3.48	1.196

As can be seen in the table 4.26, financial capacities to implement e-learning is not satisfactory it needs lots of work to improve . Annual budgets for implementing e-learning and teachers training too needs some more work to initiate e-learning. Mean value of Finance resources are more than the average (3.4 $< = 5$).

Technical resources

Table 4.27 Technical resources in the school level

Factors	N	Mean	Std. Deviation
The current technological infrastructure is adequate to build and/or sustain an e-learning environment	69	4.19	.989
The school ensure availability of physical resources and equipment for teaching and learning through e-learning at classroom.	69	4.29	.893
The school is willing to provide students and teachers access to appropriate hardware and software needed in the e-learning implementation	69	3.87	1.083
The school has a well-developed technical infrastructure to support the implementation of e-learning	69	4.14	1.033
The school has enough internet bandwidth. Neither students nor teachers complain about internet speed.Adequate and timely support is available at school to the teacher and students when technical issues arise	69	3.99	1.219
Connection speeds are sufficient for communication and accessing all course materials.	69	4.04	1.143

Teachers have adequate IT facilities to prepare e-lessons	69	4.14	.791
The hardware (Hardware- computers and accessories) facilities of my school are enough for students and teachers	69	4.32	.776
The software facilities of my school are enough for student and teacher	69	4.19	1.004
Teachers and students have access to computer whenever they need at school	69	3.43	1.519

As can be seen in the table 4.27, In the technical resources Hardware and software availability in the school level is critical and necessary for e-learning. Need to work on that to provide opportunities to get it. Other resources like technical infrastructure, communication facilities, IT facilities to prepare lessons are not enough mean value is greater than 4.0 therefore they need more works to improve it.

School Management readiness towards e-learning

Table 4.28 school management

Factors	N	Mean	Std. Deviation
School management team knows what is e-learning and its impact on teaching and learning	69	3.10	1.341
School management team support the use of e-learning in teaching and learning at classroom	69	2.90	1.352
School management team members has participated workshop on e-learning designing and implementation in schools	66	3.91	1.212
We share document and information by email or Viber group/Whatapp among teachers	69	3.29	1.318

As can be seen from Table 4.28 , mean scores for School Management readiness is higher than 2.6. It means, the institutional readiness for e-learning is far from being satisfactory and needs a lot of work .These findings indicate that there is lack of infrastructure and facilities are not sufficient to implement e-learning. They need trainings, workshops and seminars to develop e-learning. Therefore, they should identify proper strategies to improve facilities and solve related problems before e-learning.

4.3.2.5 Zonal Education office readiness towards e-learning

Policies and Monitoring

Table 4.29 Policies and Monitoring in the zonal level

Factors	N	Mean	Std. Deviation
Zonal Education Office has included e-learning implementing in external evaluation	69	3.61	1.127
Zonal Education Office has a plan for e-learning in the coming future	69	3.35	1.069

As can be seen from the table 4.29 Policies and Monitoring at the zonal level is not adequate to implement e-learning they needs lots of work to implement e-learning in the future. Mean value is above the level of 2.6 and lower than the level of 4.2

Human resources, Finance and technical resources

Table 4.30 Human resources, Finance and technical resources in the zonal level

Factors	N	Mean	Std. Deviation
Zonal Education Office is willing to provide a professional support system is in place to ensure teacher success in delivering the e-learning approach.	69	3.38	1.177
The Zonal Education Office is financially ready to venture into e-learning implementation	69	3.49	1.009
The Zonal Education Office has experienced resource persons, or a unit that organizes trainings related to e-learning.	69	3.03	1.328
The Zonal Education Office is willing to provide students and teachers access to appropriate hardware and software needed in the e-learning implementation	69	3.42	1.168

As can be seen from the table 4.30, some more work is needed for zonal level readiness towards e-learning through human resources, financial resources and technical resources. This means that preparedness at the zonal level for e-learning is far from satisfactory and requires a lot of work. These findings indicate a lack of infrastructure at the zonal level.

4.3.2.6 Provincial Level Institutional Readiness

Policies, Strategic planning and monitoring

Table 4.31 Policies, Strategic planning and monitoring in the provincial level

Factors	N	Mean	Std. Deviation
The Provincial Ministry of Education has a systematic policy of implementing and monitoring e-learning.	69	3.23	1.139
The Provincial Ministry of Education is considered e-learning an important approach for teaching and learning.	69	2.62	1.273
The Provincial Department of Education has a strategic plan to implement e-learning	69	3.43	1.105
The Provincial Department of Education is monitoring the implementation of e-learning	69	3.61	1.032

As can be seen from the table 4.31 In the provincial Level policies to e-learning is higher than the average level 2.6 therefore they needs some more work to improve. Their strategic planning and monitoring level are above the level of 3.4 less than the level of 4.2 which means they need improvements to monitor the e-learning.

Finance & Physical resources

Table 4.32 Finance and physical resources in the provincial level

Factors	N	Mean	Std. Deviation
The Provincial Ministry of Education is making an annual allocation for e-learning.	69	3.42	1.090
The Provincial Ministry of Education allocates the necessary physical resources and equipment for e-learning.	69	3.52	1.093

As can be seen from the above table 4.32 ,The financial and physical resources of e-learning at the provincial level are not adequate to match the average value2.6 greater than the value of 3.4, therefore more improvements are needed to develop it.

Human Resources

Table 4.33 Human resources in the provincial level

Factors	N	Mean	Std. Deviation
There is an officer in charge of implementing and monitoring the e-learning in the Provincial Ministry of Education	69	3.42	1.156
The Provincial Department of Education encourages teachers and principals interested in learning new technology-based learning systems	69	3.48	1.183
A group/unit under the Provincial Department of Education is carrying out the initiatives efficiently for implementing e-learning	69	3.32	1.182
The Provincial Department of Education has specialized resource persons to provide training on e-learning.	69	3.28	1.223

As can be seen from the table 4.33 human resources at the provincial level are not sufficient to monitor e-learning and teachers' principals need a lot of interest to develop e-learning, higher than the average level 2.6. They need additional works to improve e-learning from teachers. They need some works to develop e-learning through training and initiative works to develop e-learning because their mean value is between 2.6 to 3.4.

4.3.3 Overall Readiness of Northern and Southern Province

4.3.3.1 Students Readiness towards e-learning in the Northern and Southern province

Table 4.34 Students attitudes towards e-learning in the Northern and Southern Province

Factor	Mean Score		
	Northern	Southern	Overall
Students attitudes towards e-learning	2.88	3.24	3.06
Technical Skills of students	3.09	3.33	3.21
Training Availability	3.73	4.25	3.99
Support & Time Availability	3.07	3.98	3.52

As shown in Table 4.34, the students readiness towards e-learning with the mean score of 2.88 have the lowest readiness score among the others. As findings show their technical skills(3.09), Supports and availability(3.07) readiness are also the lowest among other. Probably they are more interest in using new technologies. As for training, they need more works to improve.
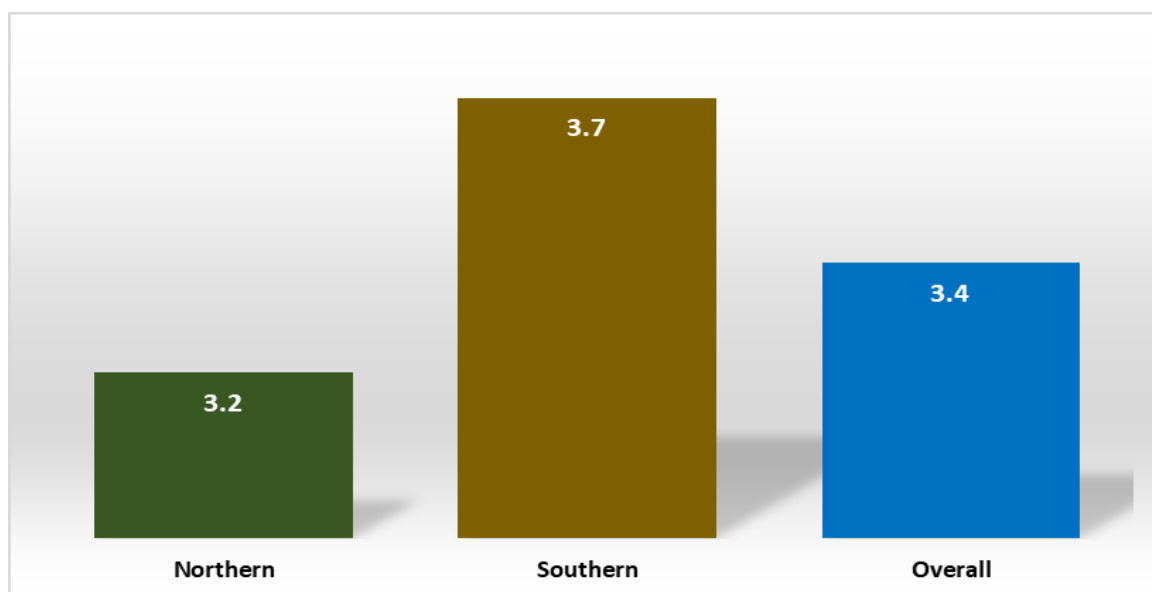
Figure 4.9 Students Readiness towards e-learning in the Northern and Southern province

In the figure 4.9 students readiness towards the e-learning in the Northern and Southern province is shown, Compare to the Southern Province Northern Province readiness is higher than the average level of 2.6. In the Northern Province Students are more interested in using new technologies. As for training, they need more works to improve.

4.3.3.2 Teachers Readiness towards e-learning

Table 4.35 Teachers attitudes towards e-learning in the Northern and Southern Province

Factor	Mean Score		
	Northern	Southern	Total
Teachers attitudes towards e-learning	2.6	3.05	2.82
Technical Skills	2.08	2.38	2.23
Commitments	2.96	3.47	3.21

As shown in Table 4.35, the teachers attitudes towards e-learning with the mean score of 2.6 have the lowest readiness score than the Technical skills. From the table it can be observed that the mean score for commitments higher than the expected level of readiness (2.6). Based on this result, it can be interpreted that Teachers must have certain obligations and be prepared for e-learning.
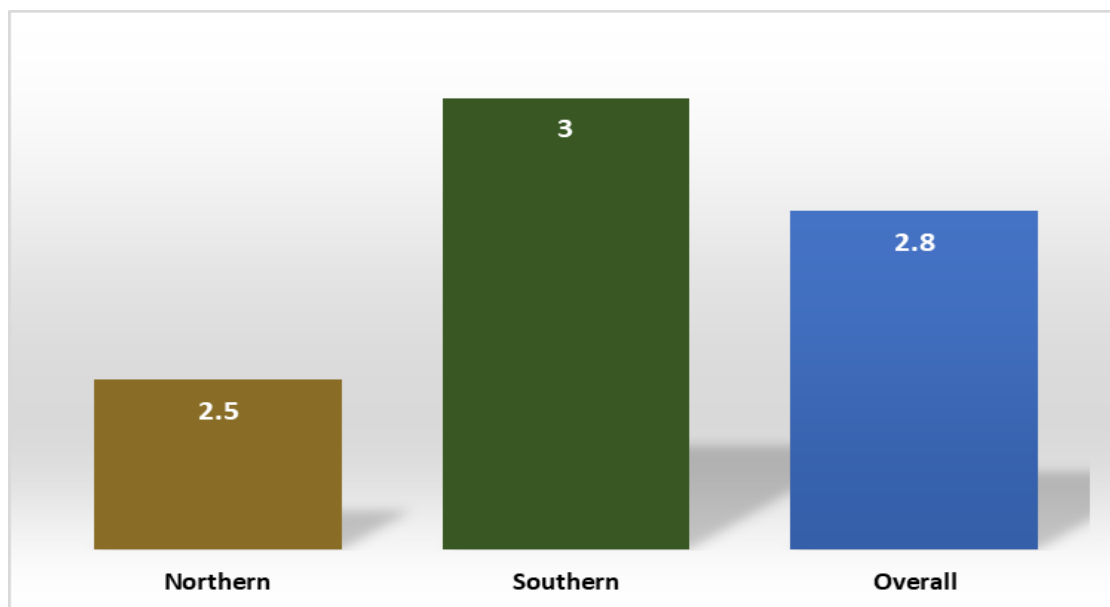
Figure 4.10 Teachers Readiness towards e-learning in the Northern and Southern province

As shown in figure 4.10, the teachers attitudes towards e-learning in the Northern Province teachers readiness is good its mean score is below the average levelbut in the southern province the teachers readiness is higher than the average level 2.6 and lower than the level of 3.4 . In the overall performance Based on this result, it can be interpreted that Teachers must have certain obligations and be prepared for e-learning.

4.3.3.3 Readiness of Provincial level Department and Ministries

Table 4.36 provincial level readiness to e-learning in the northern and southern province

Factor	Mean Score		
	Northern	Southern	Total
Policies	2.25	2.93	2.59
Resources (Finance, Human, Physical)	2.67	3.4	3.04
Strategic planning and monitoring	2.72	3.52	3.12

As shown in Table 4.36, the Provincial level readiness towards e-learning. The mean score of 2.25 have the lowest readiness score for policies in the provincial level. From the table it can be observed that the mean score for resources like finance , Human and physical are higher than the expected level of readiness (2.6) but lower than the level of 3.4   Based on this result, it can be interpreted that resources are limited for e-learning. Mean value of Strategic planning and monitoring are higher than the resources and lower than the level of 3.4. Therefore they need to take action to appoint a good resource person to monitor e-learning.
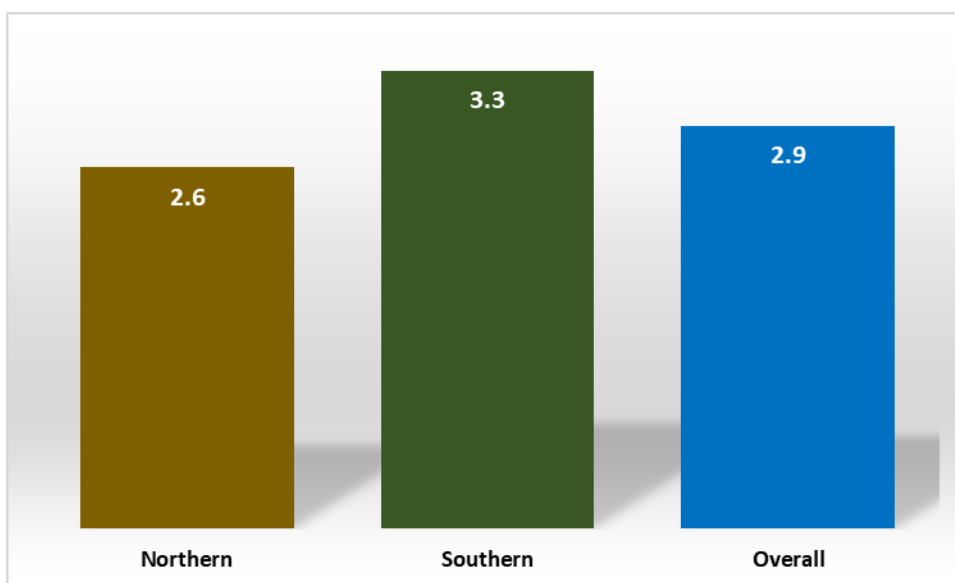
Figure 4.11 provincial level readiness to e-learning in the northern and southern province

As shown in the figure 4.11, readiness of provincial level towards e-learning is in average level 2.6 in the Northern Province. But the Southern Province Readiness towards e-learning is higher than the average level 2.6 and little below the Level of 3.4. According to this when we see the overall readiness in the provincial level is higher than the average level 2.6 therefore they need more attentions to implement e-learning.

4.3.3.4 Zonal Level readiness towards e-learning in the Northern and Southern province

Table 4.37 Zonal Level readiness towards e-learning in the northern and southern province

Factor	Mean Value		
	Northern	Southern	Total
Resources (Finance, Human, Physical)	2.82	3.33	3.08
Monitoring and policies	2.74	3.48	3.11

As shown in Table 4.37, the Zonal level readiness towards e-learning. The mean score of 2.74 have the lowest readiness score for policies in the zonal level. From the table it can be observed that the mean score for resources like finance , Human and physical are higher than the expected level of readiness (2.6) but lower than the level of 3.4 Based on this result, it can be interpreted that resources are limited for e-learning. Therefore they need to take action to maintain a good resources to develop e-learning.
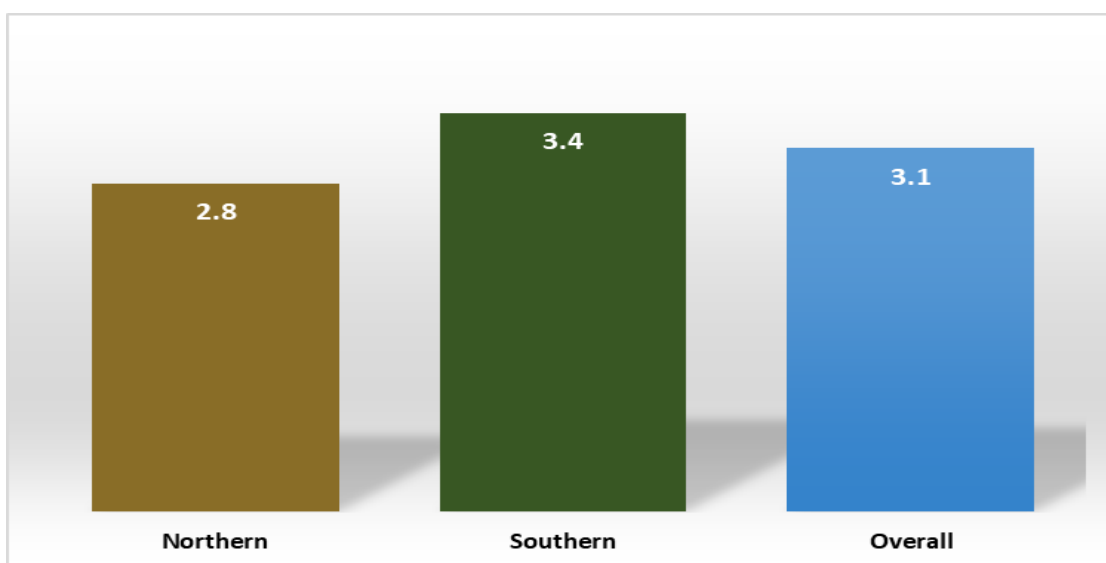
Figure 4.12 Zonal Level readiness towards e-learning in the northern and southern province

As can be seen from the Figure 4.12, Zonal Level readiness towards e-learning is higher than the average Level 2.6 Both provinces needs lots of work to implement e-learning. The overall readiness also greater than the average level of 2.6 and lower

than the Level of 3.4. Based on this result, it can be interpreted that zonal level readiness are limited for e-learning. Therefore, they need to take action to maintain a good resources policies and monitoring facilities to develop e-learning
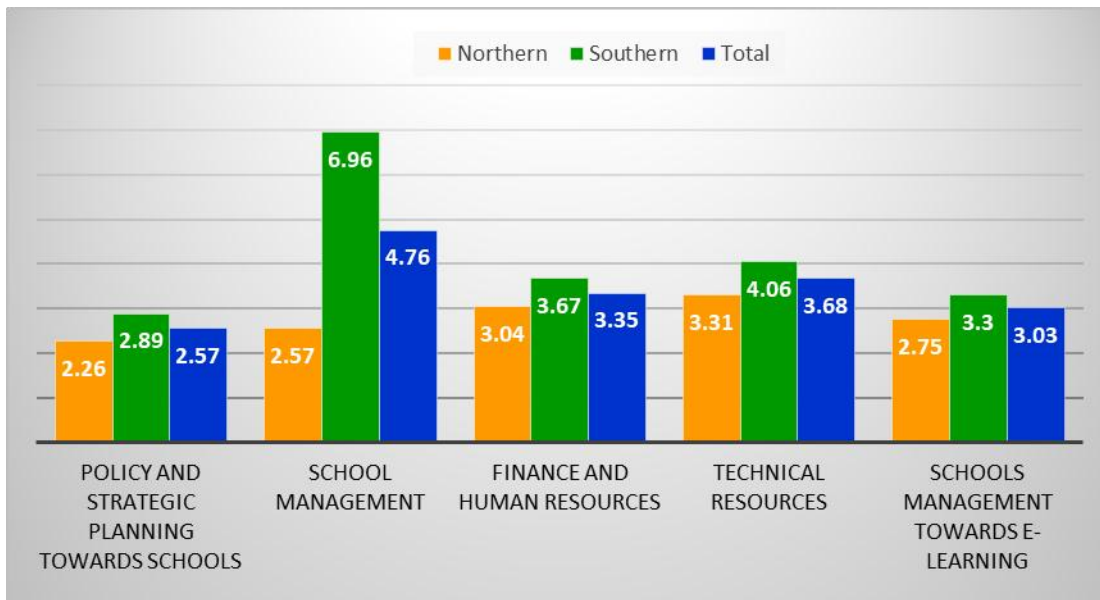
Figure 4.13 school readiness towards e-learning

As shown in the above figure, the School level readiness towards e-learning. The mean score of 2.26 have the lowest readiness score for policies and strategic planning in the school level. From the table it can be observed that the mean score for resources like finance, Human and physical are higher than the expected level of readiness (2.6) but lower than the level of 3.4 Based on this result, it can be interpreted that resources are limited for e-learning. Therefore, they need to take action to maintain a good resource to develop e-learning. School management level of planning towards e-learning is little higher than the average mean value 2.6.
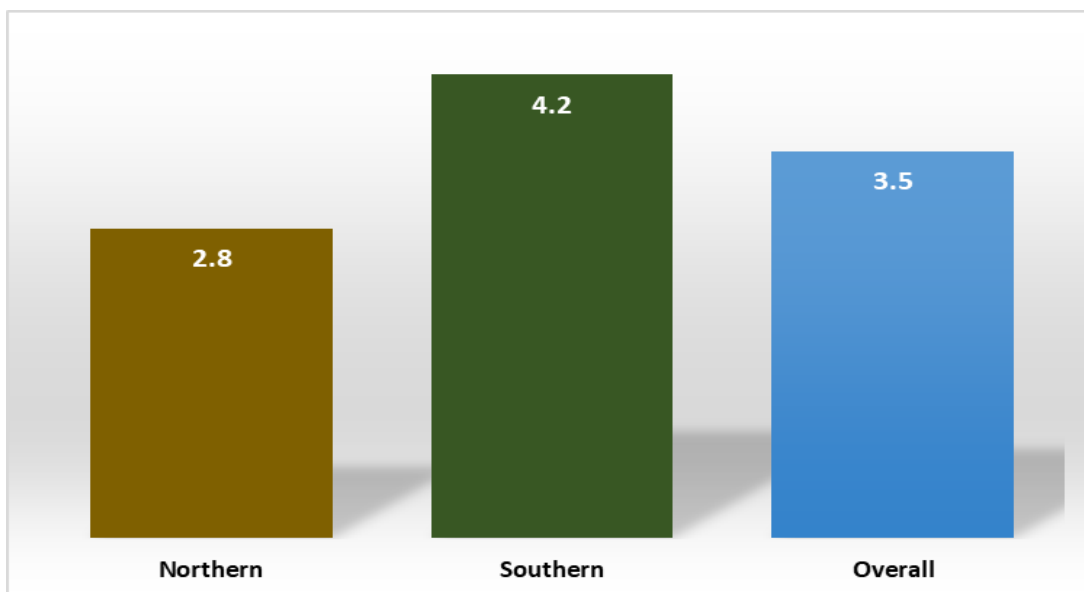
Figure 4.14 School Level readiness towards e-learning in the northern and southern province

As shown in the figure 4.14 school level readiness towards e-learning is not satisfactory among the two provinces. Both province, schools readiness are over the average level of 2.6. They need more attention to implement e-learning. When we compare to Southern province Northern Province schools readiness is better. Because its mean score is not much higher as its mean score level is below the value 3.4. In the Southern Province the mean score Level is higher than the level of 3.4. According to the overall readiness the mean score is higher than the value of 3.4. Based on this result in the school level they have to work lots to implement e-learning.

Table 4.39 Principals' acceptance towards e-learning in the northern and southern province

Factor	Mean Value		
	Northern	Southern	Total
Acceptance of Principal	1.69	1.58	1.64

As shown in the above Table 4.39, The table results show that except training readiness all other readiness factors of principal have higher scores. The mean value

of principal acceptance is lower than the average level 2.6 and also lower than the level of 1.8. The principals overall readiness score is also higher. Thus we can say So we can say that principals in general are more interested in developing e-learning.
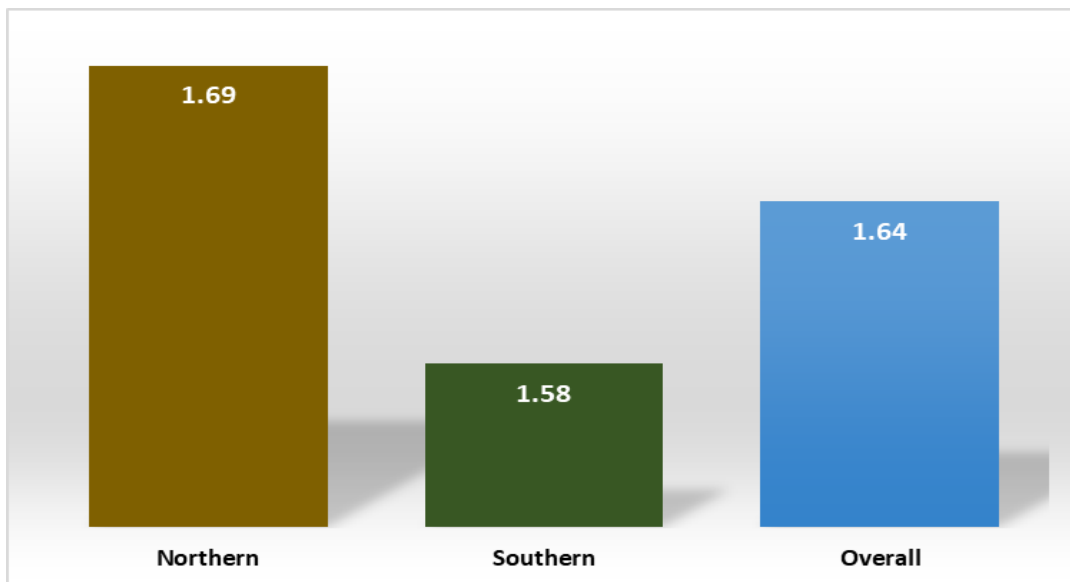
Figure 4.15 Principals acceptance towards e-learning in the northern and southern province

As shown in the figure 4.15, We came to know that the principal acceptance towards e-learning is good. They wish to implement e-learning in their schools. According to the figure Sothern province Principals Acceptance is lower than the Northern province principals acceptance but the both province are lower than the level of average level of 2.6 Overall readiness also Lower than the average value 2.6. In the principals level they encourage e-learning and they will give support to implement e-learning.

CHAPTER 05:
CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The findings were divided into mainly three based on the objective of the study: current level of implementation or practice, future influencing on e-learning implementation, assessment of readiness of general education system and recommended strategies for implementing e-learning efficiently

The learning become very important for teaching and learning in the general education because findings reveal there are great benefit for teachers and students. The benefits of e-learning are the students clearly understanding individual attendance, long retains, motivation for low performing student. Not only student but also teachers get benefit through e-learning such a reduce work load, encourage to learn new things and opportunities to prepared lesson easily.

The current level of e-learning implementation evaluates through internal of the government projects, availability digital content, access/ usage of available digital content. The government initialize a lot of project on e-learning time to time, but there was no sustainability

Further effectiveness of e-learning implementation mainly based on availability of digitalized curriculum and learning management system. The digitalized curriculum of general education (grade 1 to 13) are very few in Sri Lanka compared with traditional teaching content (Print book, notes etc.)

There are few digitized curriculum/ lessons in general education the research finding indicate the accessing content from the learning management system is high. More students access from LMS during examination but the teacher's usage at classroom level compared with LMS are low because of unavailability of resource and facilities at school. The quantitative finding indicate that 51 percentage of school in Northern province did not have designated classroom for e-learning where as school in the Southern Province 70% percentage of schools did not have designated classrooms for e-learning. In addition to this, the digitalized content also important for effective

implementation but 69 percentages of schools in Northern Province didn't have digital content while 71% percentage of school in Southern Province didn't have digitalized content These indicated that general education system in e-learning implementation are initial stage in Northern and Southern Province

Data analyses indicate that policy in general education system strongly influence on implementation of e-learning because the government operation also most depend on the policy development time to time but there is no policy on e-learning in national and provincial level education systems. The findings revealed effective implementation of e-learning should be developed in future.

Finding indicate that principals, Teachers and student are main factors for e-learning. Mainly principal characteristics such as attitudes, Technical skill, Leadership, commitment and acceptance influence on e-learning implementation. The principal in general education felt that if they initialized e-learning methodology it might be burden for them. The principal attitudes need to be changed further principal have lack of technology skill and commitment but they were ready to implement e-learning in their school based on their positive response during interviews. Not only principal but also teacher play vital role in implementing e-learning.

The characteristics of teachers : attitudes , commitment resistance to pedagogical change , teachers work load technical competency and prior knowledge on e-learning methodology influence strongly in efficient implementation of e-learning. The finding indicates that teacher were lack of technical competency because during the focus group discussion, they always mentioned that they got help from ICT teachers. Further, they felt teaching through e-learning was extra work and it create burden for them some teachers were not interest to change their teaching method.

The students characteristics also very crucial for e-learning the finding reveal that students interest attitude, technical competency, parent support and priority conflict (time) were crucial factors which influence on e-learning. Further, result indicated students are very interested on e-learning but some student show negative attitudes also.

Another factor was pedagogy which have long time impact on e-learning. The Pedagogy included examination system, availability of digital content and integration of IT with teaching and learning process. The examination system in general education system mostly based on written examination therefore teacher was not willing to change teaching methodology. This was major barriers teaching methodology. This was major barriers for e-learning and most of the local curriculum were not integrated with information technology.

Fourth factor was resources in general education system. The resource consists of financial resource, human resource and physical resource, these factors were very important for e-learning implementation. The school face big issues to pay electricity bills monthly. If they use computer and lack of budget line for e-learning. The human resources are lacking with subject knowledge and IT knowledge. Further there is no technical assistant designation for ICT Lab.

Physical infrastructure and facilities are very important but there are school without proper infrastructure and facilities. Some school didn't have even electricity the finding further revealed that some infrastructure available which are not suitable for teaching and learning by e-learning.

Another factor was technology which is very crucial important for e-learning implementation But in general education system there were lack of technology facilities ….. equipment. Further, there were level of internet broadband facility and lack of separate classroom and lack of infrastructure for e-learning. In addition, There were big issues which school face maintain the available hardware and replacing hardware items.

The finding revealed that institutional factor play crucial role in implementing e-learning in the general education system. There are hierarchical order in the educational institution in Sri Lanka such as Ministry of Education institution for teacher performance development province ministries and Department of Education, Zonal Education office Divisional Education office.

Each institutes and its function have great impact on e-learning implementation the result revealed that there was no separated division for e-learning and no requirements

facilities at national/ provincial/ zonal level. There were lack of capacity for enhancing quality of e-learning implementation.

The final objective of the study is to assess the readiness of the general education system which consist of prepare readiness student of readiness, Teachers readiness, principals acceptance and institutional readiness school readiness, provincial Ministry of education and Zonal Educational readiness.

The readiness were ranked from 1 to 5; ready go ahead (m = 1- 1.8), ready need a few important (m=1.8 – 2.6) Explained level of readiness (M= 2.6) not ready need some work (m = 2.6 – 3.4) and not ready need a lot of work (m = 3.4 - 5)

The expected readiness mean score is (M = 2.6) First, the students readiness mean score is 3.4. This indicate that students need to be prepared to adopt e-learning at school. The students readiness sub factors are students attitude (m= 3.06) Technical competency (m = 3.29), Training (m = 3.99) and support and time availability (m = 3.52) All sub factors also higher than the expected readiness level.

Another one is the teachers readiness (m=3.4) which was higher than expected level of readiness. The components of teachers readiness are teachers attitude (m= 2.82) Teachers technical competency (m = 2.23) and teachers commitments (m = 3.21) The result indicates teacher also need to be prepared and provided proper training to implement e-learning effectively.

Under the people readiness factor, the principals acceptance which was very important. The finding revealed that the principals acceptance level was 1.64 This indicates that principal were ready to implement e-learning.

Readiness of schools towards e-learning is higher than the expected level of readiness. The components of schools readiness are School management (M = 4.76), Technical resources (M = 3.68), Finance and Human resources (M = 3.35), School management towards e-learning (M = 3.03) and Policy and strategic planning towards schools (M = 2.57). Based on the result it can be interpreted that resources in schools are not enough or limited. Therefore they need to take actions to maintain good resource to develop e-learning.

In the provincial level readiness towards e-learning readiness is higher than the expected level (M = 2.6). The components of readiness of Provincial level Department and ministries readiness are Policies (M= 2.59), Resources like finance, human and physical (M=3.04), strategic planning and monitoring (M= 3.12). This indicates that in the provincial level resources are limited and they have to take necessary action to implement policies related e-learning and have to appoint human resources to monitor the e-learning activities.

In the zonal level readiness of e-learning components like resources (M= 3.08), Monitoring and policies (M = 3.11) are higher than the expected level of (M = 2.6). This indicate they need to maintain good resources, policies and monitoring facilities to implement e-learning.

5.2 Recommendation

In National Level there should be common learning management system this LMS should include all digital content general education curriculum of Sri Lanka. Further it should be accessible without internet data consumption cost. All student can access without data charge. This LMS should promote teachers to updated content themselves. There should be a system to be developed to get benefit for teacher even cost of preparation of digital content further it may provide motivation facilities for teacher who create more content. The teacher who create more content get more badges.

National Level Institute which provide training for teacher, provide compulsory e-learning module. The teacher should be trained on e-learning module. The teacher should be trained on e-learning on hand experience. These institute should be equipped adequate equipment or accessories.

National Level, A unit should be established to monitoring and give accreditation for provide institute which create e-content.

National Level policy should be created for e-learning. This policy should be covered implementation of e-learning. The purchasing equipment usage of IT equipment and teachers training.

In Provincial Level the Ministry of Education should prepare policy along with National Level policy. The policy should include usage of IT equipment Purchase of equipment, content develop designed and monitoring system.

In provincial Department Education, A unit should be established with fully equipment The expert resource persons should be recruited for this unit They Should have capacity or ability to provide training for zonal office staff and teacher

The Provincial unit create effective monitor system All officer at Zone Level Should be trained on Monitoring System

The e-learning should be developed with interactive facilities and content should be suitable for students competency. There Should be facilities for student to access lesson based on their competency

At Provincial Level also, a committee should be created with all subjects expert and Technical expert for monitoring and provide accreditor for e-learning created by provincial level institute.

The Ministry of education school create cadre for instructional designers and Learning management system (LMS) administrators at zonal education office and provincial Department of Education.

A Zonal Level, A unit should be established to give guidance for teachers at zonal level. At this unit there should be hotline for support teacher who face difficulties in the classroom. There should be a expert team which should consist for software and hardware technicians. There should be proper mechanism to support complain from school and they should take action based on priority.

The digital content should be flexible for online and offline meeting. Offline content are used by rural schools which don't have internet access. Further the content should be suitable for TV programme.

A circular should be designed for teachers who involve the teacher by using e-lesson. They need to get more opportunities for promotion further, there should be chance to get salary increment for teachers who use e-lesson at their classroom.

The Zonal external evaluation tools should be modified including scale e-learning implementation.

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Appendixes: 1 Key informant Interview Guide

RESEARCHER:

Mr. I.Kailasapathy
Ministry of Education
Northern Province

Date:

Dear Sir/Madam

I am a principal researcher under the Research Grant Programme of the National Institute of Education. I am undertaking a research project titled: **A Critical Analysis on Implementation of eLearning in General Education of Sri Lanka**

Purpose of the study

The purpose of this study is to identify the contextual factors that have a significant impact on the implementation of e-learning at schools in Sri Lanka

Confidentiality and anonymity

All raw data will be kept confidential. The collected, collated and analysed data may be published in case studies, academic journals and/or presented at conferences. Any information and opinions that you provide will not be attributed to you, and in the research report, individuals will be described using generic role descriptions. Kindly note however, that it may be possible to infer from the information provided, the identity of the individual interviewee. The name of your organization may also be used in the reporting of the findings. There will be an opportunity for you to review any written notes or transcripts of recorded sessions that result from the interviews, to ensure that material is recorded accurately.

Throughout the project, hard copies of data and interview tapes will be secured in a locked cupboard in my office. Electronic files will be stored in password protected files, with access being restricted to me and the co-researchers. The data will be expunged two years after the conclusion of the project.

Researcher's contact details:

I.Kailasapathy, Performing Director, LMDMU, Ministry of Education, Northern Province, Nallur.

If you agree to participate in the interview, kindly fill in the attached consent form. Should you feel the need to withdraw from the project, you may do so at any time by informing me beforethe 31st December 2019. If you do so, all information provided by you will be removed from the study and all records of your participation removed.

Yours sincerely,

I.Kailasapathy

Signed:

1) Central government/line ministry officials/administrators

(Factors identified: IT Policy, funding, not compulsory, monitoring, curriculum, language, content, standards for developing e-lessons, copy right issues)

1. What do you understand by e-learning?
2. What is your opinion about e-learning versus traditional learning?
3. What is the current policy on e-learning in the country?
4. To what extent has the policy been implemented at the national level?
5. In your opinion, what is the level of commitment towards implementing e-learning at the national level?
6. What resources are available to implement e-learning at the national level?
   Budget
   Human Resources/ Training
   Infrastructure Equipment
   Curriculum Lesson

7. Please describe some of the initiatives taken by the government/Ministry of Education to implement e-learning? To what extent have these initiatives been successful?

8. In your opinion, what are some of the challenges associated with implementing e-learning in Sri Lanka?

    Budgetary allocations

    Human resources/Teachers/training/efficacy

    Infrastructure/equipment

    Technology/access/internet/Support

    Students/Skill/ efficacy

    Curriculum/e-lessons

    Learning and teaching

    Coordination

    Monitoring and evaluation

    Resistance to change

    Society

    Institution (National /provincial/schools level)

    Policies on e-learning

9. What plans are underway for e-learning at the national level?

10. In your opinion, what is needed to implement e-learning successfully?

    Budgetary allocations

    Human resources/Teachers/training/efficacy

    Infrastructure/equipment

    Technology/access/internet/Support

    Students/Skill/ efficacy

    Curriculum/e-lessons

    Learning and teaching

    Coordination

    Monitoring and evaluation

    Resistance to change

    Society

    Institution (National /provincial/schools level)

    Policies on e-learning

2) Provincial and zonal level administrators

(Factors identified: lack of coordination, lack of advocacy of line ministry, methodology changing/not accepting, not important, knowledge on e-learning, placement of teachers/ recruitment, involving teachers in curriculum development; additional work, monitoring, appraisal system, unit for e-learning, computer resource centre, content development, hardware team)

1. What do you understand by e-learning?
2. What is your opinion about e-learning versus traditional learning?
3. What is the current policy on e-learning in the country?
4. To what extent has the policy been implemented in the Northern/Southern Province?
5. In your opinion, what is the level of commitment towards implementing e-learning at the national level?
6. In your opinion, what is the level of commitment towards implementing e-learning at the provincial level?
7. What resources are available to implement e-learning in your province/zone?

    Budget

    Human resources/training

    Infrastructure/equipment/e-learning unit/IT centre

    Learning model /online/ offline

    Curriculum/e-lessons
8. Please describe the e-learning initiatives being undertaken in your province/zone.
9. To what extent have these initiatives been successful?
10. In your opinion, what are some of the challenges associated with implementing e-learning in your province/zone?

    Budgetary allocations

    Human resources/Teachers/training/efficacy

    Infrastructure/equipment

    Technology/access/internet/Support

    Students/Skill/ efficacy

    Curriculum/e-lessons

Learning and teaching

Coordination

Monitoring and evaluation

Resistance to change

Society

Institution (National /provincial/schools level)

Policies on e-learning

11. What plans are underway for e-learning in your province/zone?

12. In your opinion, what is needed to implement e-learning successfully in your province/zone?

Budgetary allocations

Human resources/Teachers/training/efficacy

Infrastructure/equipment

Technology/access/internet/Support

Students/Skill/ efficacy

Curriculum/e-lessons

Learning and teaching

Coordination

Monitoring and evaluation

Resistance to change

Society

Institution (National /provincial/schools level)

Policies on e-learning

3) Principals of government schools

(Factors identified: time table management, knowledge on e-learning, workload, culture for e-learning, support staff, electricity consumption, equipment maintenance/damage, phone not allowed, promoting strategies, IT policy, computers/equipment, IT support staff, lack of facilities/space, outdated equipment, low quality, repairing procedure, hardware team)

1. What do you understand by e-learning?

2. What is your opinion about e-learning versus traditional learning?

3. What is the current policy that guides e-learning in your school?

4. To what extent have you been able to implement this policy in your school? What strategies do you use to promote e-learning?

5. In your opinion, what is the level of commitment towards implementing e-learning at your school?

6. Is your staff supportive of implementing e-learning?

7. What resources are available to implement e-learning in your school?

    Financial

    Human resources/training (including IT)

    Infrastructure/equipment/IT centre/maintenance

    E-learning materials/resources

8. What are the sources of e-learning materials available to your teachers?

9. Please describe the e-learning initiatives that are being carried out in your school.

    To what extent have these initiative been successful?

10. In your opinion, what are some of the challenges associated with implementing e-learning in your school?

    Budgetary allocations

    Human resources/Teachers/training/efficacy

    Infrastructure/equipment

    Technology/access/internet/Support

    Students/Skill/ efficacy

    Curriculum/e-lessons

    Learning and teaching

    Coordination

    Monitoring and evaluation

    Resistance to change

    Society

    Institution (National /provincial/schools level)

    Policies on e-learning

11. What plans are underway for e-learning in your school?

12. In your opinion, what is needed to implement e-learning successfully in your school?

    Budgetary allocations

    Human resources/Teachers/training/efficacy

    Infrastructure/equipment

    Technology/access/internet/Support

    Students/Skill/ efficacy

    Curriculum/e-lessons

    Learning and teaching

    Coordination

    Monitoring and evaluation

    Resistance to change

    Society

    Institution (National /provincial/schools level)

    Policies on e-learning

4) Administrators of private education centres

Factors identified: private tuition classes

1. What do you understand by e-learning?
2. What is your opinion about e-learning versus traditional learning?
3. To what extent have you been able to implement e-learning in your education centre? What strategies do you use?
4. In your opinion, what is the level of commitment towards implementing e-learning at your education centre?
5. Is your staff supportive of implementing e-learning?
6. What resources are available to implement e-learning in your centre?
    Financial

    Human resources/training (including IT)

    Infrastructure/equipment/IT centre/maintenance

    Curriculum

    E-learning materials/resources
7. What are the sources of e-learning materials available to your teachers?
8. Please describe the e-learning initiatives that are being implemented in your centre. To what extent have these initiatives been successful? What are some of the outcomes you have observed?

9. In your opinion, what are some of the challenges associated with implementing e-learning in your centre?

    Financial

    Human resources/recruitment/training (including IT)

    Infrastructure/equipment/maintenance

    Curriculum development

    E-learning materials

    Monitoring and evaluation

    Resistance to change

10. What plans are underway for e-learning in your centre?
11. In your opinion, what is needed to implement e-learning successfully in your centre?

    Financial

    Human resources/training (including IT)

    Infrastructure/equipment/maintenance

    Curriculum

    E-learning materials/resources

Appendixes II Focus Group Discussion Guides1) Government school teachers

(Factors identified: contraction of policy, training, access to IT resource, time management, syllabus loading, less time, time table allocation, lack of equipment, rules/conditions, lack of access to IT, tools for activities, knowledge on e-learning, training for teachers, special subject allocation time for e-learning, integrating with subject, acceptance among teachers)

1. What do you understand by e-learning?

2. What is your opinion about e-learning versus traditional learning?

3. In your opinion, what is the level of commitment towards implementing e-learning at your school?

4. Is the staff supportive of implementing e-learning?

5. To what extent do you feel supported in implementing e-learning in your class room? Please describe the support you receive to implement e-learning in your class room.

6. What resources are available to implement e-learning in your class room?

> Infrastructure
>
> Equipment
>
> IT support
>
> Time
>
> Curriculum
>
> E-learning materials/resources

7. What are the sources of e-learning materials available to you?

> E-Thaksalawa
>
> Nanasa
>
> YouTube
>
> e-lessons of Ministry of Education, NP

8. What kinds of e-learning training programmes are available for teachers?

9. Please describe the ways you integrate e-learning into your teaching-learning activities.

> To what extent have these activities been successful?
>
> What are some of the outcomes you have observed among students?

10. In your opinion, what are some of the challenges associated with implementing e-learning in your class room?

> Training (including IT)
>
> Infrastructure/equipment/maintenance
>
> Technology (Access, software)
>
> Curriculum
>
> Timetable
>
> E-learning materials
>
> Students
>
> Principals
>
> Society

11. Do you have plans to introduce/improve e-learning in your classes? If yes, please describe how you intend to do so.

12. In your opinion, what is needed to implement e-learning successfully in in your class room?

       Training (including IT)

       Infrastructure/equipment/maintenance

       Curriculum

       Time table

       E-learning materials/resources

       Technology

       Students

       Institutes

       Pedagogy

2) Students

(Factors identified: social media distraction, lack of acceptance, no access to IT labs/only for IT students, tuition, group/individual activities, parental attitude, availability of equipment at home, economic issues, access to IT, private classes, peer parent, monitoring access, lack of knowledge on IT, addicted to IT equipment, internet access, lack of self-directed learning culture by e-learning, expenses, access to education)

1. What do you understand by e-learning?
2. Would you prefer e-learning over chalk and board teaching? Why or why not?
3. What kinds of e-learning resources are available to students in your school?
       Infrastructure/equipment
       IT support
       E-learning materials
4. For what purposes do you use e-learning technologies available in your school?
5. Please describe the e-learning activities that are used in your classes. (Ask about each subject separately)
6. Roughly how much time do you spend on e-learning on an average day in school?
7. What difficulties do you face in using e-learning resources in your school?
       Curriculum/timetable
       Principal/
       Teacher attitudes
       Internet access/equipment
       Motivation
       Technological skill for access
       Lack of self-directed learning culture
8. Other than in school, where else do you participate in e-learning?
9. Do your parents encourage you to participate in e-learning activities outside of school? If so, in what kinds of activities?
10. Are e-learning technologies used in private tuition classes? If so, in what ways?

11. How much time do you generally spend on e-learning outside of school?
12. What difficulties do you face in using e-learning resources outside of school?
    Parental attitude
    Internet access/equipment
    Social media
    distraction/addiction
    Private tuition
    Cost

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Consent to Participation in Research (Key Informant Interviews)

[Please mark each box with a √ to indicate agreement]

1. I have been given to understand and have understood an explanation of this research project and the confidentiality conditions

2. I have had an opportunity to ask questions and have had them answered to my satisfaction
3. I agree to be interviewed by researchers for the purpose of this research, and I consent to the use of my perceptions, experiences, opinions and information in this research provided they are not attributed to me.

4. I understand that I will be given the opportunity to review and comment on the summary of the interviews.

5. I understand that all data collected (tapes and interview transcripts) will be destroyed two years after the completion of the project

6. I understand that I may withdraw from this project at any time up until 31st December 2019, and that in this instance, all data collected (tapes and interview transcripts) will be immediately destroyed and excluded from the study.

7. I would like to receive feedback on this research, in the form of a research summary.

8. I understood that the collected, collated and analysed data will be published in case studies, academic journals and/or presented at conferences.

9. I confirm that I DO ☐   DO NOT ☐ have the approval of my employer to participate in this research project.

10. I agree to have interviews digitally-recorded (audio) YES ☐   NO ☐

Name:

Signed:

Date:

Consent to Participation in Research (Focus Group Discussion)

(Please mark each box with a √ to indicate agreement)

1. I have been given and have understood an explanation of this research project and the confidentiality conditions   ☐

2. I have had an opportunity to ask questions and have them answered to my satisfaction   ☐

3. I agree to be interviewed by researchers for the purpose of this research, and I consent to the use of my perceptions, experiences, opinions and information in this research provided they are not attributed to me.   ☐

4. I understand that all data collected (recordings and transcripts) will be destroyed two years after the completion of the project   ☐

5. I understand that I may withdraw from this project before start the discussion since I cannot withdraw information provided by me from the focus group once it is recorded   ☐

6. I would like to receive feedback on this research, in the form of a research summary.   ☐

7. I agree to have interviews digitally recorded (audio and video) YES NO

Name:

Signed:

   Date:

Appendix III Questionnaire for Principal

Background Information

1.1 School Profile

Name of School	
School Type(1AB/1C/II)	
School	National School ☐ Provincial ☐
Zonal Education	
Grade Span (1-13/6-13/6-11/1-11)	
No of student (Grade 6-11 only)	

1.2 Profile of school Information Technology

Items	No of Items	Adequate (Put tick √)	Inadequate (Put tick √)
No of Computers			
No of Usable Computers			
No of Multimedia Project			
Internet Router			
Chairs (Computer)			
Table (Computer)			
Printer			
Scanner			
LCD/LED TV			

For the purpose of this research, e-learning is defined as follows

"E-learning is a learning activity in the classroom and outside the classroom using electronic tools (Computer, Multimedia, SMART board, SMART Phone & TV etc…) with the help of online video, audio, presentation and other software (software & apps). A system that provides education customize to students for the present time"

2. Current usage of e-learning at school

2.1 Do you have designated classroom for e-learning

      Yes   ☐

      No   ☐

2.2   If yes, available facilities in that classroom

    1.   Multimedia with computers   ☐

    2.   Smart board and computer   ☐

    3.   TV with all facilities   ☐

    4.   Computer   ☐

2.3   Do you have any digital content for teaching and learning

      Yes   ☐   ☐

      No

2.4   If yes, where is available

    1.   Library   ☐

    2.   Classroom   ☐

    3.   Computer Lab   ☐

    4.   4.Office Room   ☐

Instruction for filling following questionnaire

Based on your valuable experience in using e-learning, read the following statements about e-learning and its use within your school and indicate how much you agree/disagree.

Statement	4Readiness Scale	Percentage of teacher/Students
Strongly Agree	1	81-100%
Agree	2	61-40%
Neutral(Agree/Disagree)	3	41-60%
Disagree	4	21-40%
Strongly Disagree	5	01-20%

5. Students' Readiness for implementing e-learning (Grade 6- 11)

No	Questions	SA (81-100%)	A (61-80%)	N (41-60%)	D (21-40%)	SD (1-20%)
1	My students have knowledge on e-learning					
2	My students find it easy to use e-learning					
3	Students know the basic functions of computer hardware components (CPU and monitor) including its peripherals like the printer, speaker, mouse etc					
4	Students know how to turn on and shutdown the computer properly					
5	Students know and find it easy to use web browsers and emails.					
6	The students can find it easy to type using computers					
7	The students are able to type their own language correctly					
8	Students have attended seminars/ workshops related to e-learning activities					

9	The parents of my students support the use of e- learning at home					
10	My students are capable to manage their time well in e-learning					
11	Students believe that e-learning is beneficial to them and that is necessary for this time.					

4. Teachers' Readiness for implementing e-learning (Secondary teachers)

No	Questions	SA (81-100%)	A (61-80%)	N (41-60%)	D (21-40%)	SD (1-20%)
1	Teachers know the basic functions of computer hardware components (CPU and monitor) including its peripherals like the printer, speaker, mouse etc					
2	Teachers know about MS office /word processing and use it comfortably					
3	Teachers know how to use presentation software (Software: PowerPoint) effectively					
4	Teachers are very clear about what is e-learning.					
5	Teachers believe that e-learning is helpful to improve teaching and learning					
6	Teachers are ready for integrating e-learning in their teaching					
7	Teachers believe that e-learning is beneficial to students and is essential for this time.					
8	Teachers are dedicated to use technology for teaching and learning at the school level					
9	Teachers have attended seminars/ workshops related to e-learning activities					
10	Teachers were trained on the design and use of e-learning in the classroom					

	Preparation for the implementation of e-learning at the provincial and zonal level
	Based on your valuable experience in using e-learning, read the following statements about the readiness of the Ministry of Education, the Provincial Department of Education and the Zonal Education Office to implement e-learning in your school and indicate to what extent you agree.

5. **e-learning implementation readiness of Provincial and Zonal level Administration**

No	Questions	SA (81-100%)	A (61-80%)	N (41-60%)	D (21-40%)	SD (1-20%)
1	The Provincial Ministry of Education has a systematic policy of implementing and monitoring e-learning.					
2	The Provincial Ministry of Education is considered e-learning an important approach for teaching and learning.					
3	The Provincial Ministry of Education is making an annual allocation for e-learning.					
4	The Provincial Ministry of Education allocates the necessary physical resources and equipment for e-learning.					
5	There is an officer in charge of implementing and monitoring the e-learning in the Provincial Ministry of Education					
6	The Provincial Department of Education encourages teachers and principals interested in learning new technology-based learning systems					
7	A group/unit under the Provincial Department of Education is carrying out the initiatives efficiently for implementing e-learning					
8	The Provincial Department of Education has specialized resource persons to provide training on e-learning.					
9	The Provincial Department of Education has a strategic plan to implement e-learning					

No	Questions					
10	The Provincial Department of Education is monitoring the implementation of e-learning					
11	Zonal Education Office is willing to provide a professional support system is in place to ensure teacher success in delivering the e-learning approach.					
12	The Zonal Education Office is financially ready to venture into e-learning implementation					
13	The Zonal Education Office has experienced resource persons, or a unit that organizes trainings related to e-learning.					
14	The Zonal Education Office is willing to provide students and teachers access to appropriate hardware and software needed in the e-learning implementation					
15	Zonal Education Office has included e-learning implementing in external evaluation					
16	Zonal Education Office has a plan for e-learning in the coming future					

e-learning implementation readiness of School

Prepare to implement e-learning in your school

Based on your valuable experience in using e-learning, read the following statements about the readiness of the school to implement e-learning in your school and indicate to what extent you agree.

No	Questions	SA (81-100%)	A (61-80%)	N (41-60%)	D (21-40%)	SD (1-20%)
1	An e-learning initiative is aligned with the our school's mission					
2	The school has strategic plan for implementing e-learning in future					
3	Our school encourages teachers to engage in teaching by using modern technology					
4	There is committee involving directly to implementing e-learning at schools level					

5	The school is willing to provide a professional support system is in place to ensure teacher success in delivering the e-learning approach.					
6	The school has financial capacities to implement e-learning					
7	The school is willing to create annual budget for implementing e-learning					
8	The school has experienced teachers who are able to provide trainings on e-learning for co-teachers					
9	The school has adequate teachers to support an e-learning initiative					
10	The current technological infrastructure is adequate to build and/or sustain an e-learning environment					
11	The school ensure availability of physical resources and equipment for teaching and learning through e-learning at classroom.					
12	The school is willing to provide students and teachers access to appropriate hardware and software needed in the e-learning implementation					
13	The school has a well-developed technical infrastructure to support the implementation of e-learning					
14	The school has enough internet bandwidth. Neither students nor teachers complain about internet speed Adequate and timely support is available at school to the teacher and students when technical issues arise.					
15	Connection speeds are sufficient for communication and accessing all course materials.					
16	Teachers have adequate IT facilities to prepare e-lessons					
17	The hardware (Hardware- computers and accessories) facilities of my school are enough for students and teachers					
18	The software facilities of my school are enough for student and teacher					
19	Teachers and students have access to computer whenever they need at school					

No	Questions				
20	School management team knows what is e-learning and its impact on teaching and learning				
21	School management team support the use of e-learning in teaching and learning at classroom				
22	School management team members has participated workshop on e-learning designing and implementation in schools				
23	We share document and information by email or Viber group/Whatapp among teachers				

Readiness of principals to implement e-learning at school level

Read the following statements regarding the readiness of principals to implement e-learning in your school and indicate to what extent you agree with what is indicated in the table below.

6. Acceptance of Principals for e-learning at school

No	Questions	SA (81-100%)	A (61-80%)	N (41-60%)	D (21-40%)	SD (1-20%)
1	I am keen to prepare e-learning material					
2	I hope that e-learning enhance the quality of learning and teaching in my school					
3	I hope that using e-learning can increase productivity of school					
4	I hope that e-learning enables school to accomplish teaching more effectively than the traditional classroom based approach					
5	I hope that implementation of e-learning will be easy at my school.					
6	I support implementation of e-learning in my school in an effective manner.					