Challenges in Effective Implementation of E-Learning in Sri Lanka

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Abstract:-

Electronic learning is one of modern approaches to distance learning which requires pedagogical and as well as technological know-how. E-Learning opens the immense opportunities to education with its flexibility advantage. This is a solution for enhancing learning opportunities in Sri Lanka, which is limited at present. The research study aims to identify the restricting factors which are critical in effective e-learning implementation for undergraduate programs in Sri Lankan universities for distance education programs. The research identifies teachers'/ instructors' role as a prerequisite for e-learning, and three supporting variables. The research was carried out based on a sample of teachers/instructors in two universities, which have already initiated the e-learning mode of learning. Although teachers'/ instructors' role is favorable towards e-learning, the research identified the factors that are least supportive to e-learning. Finally, the research provides the recommendations to the Government and educational institutions to improve the e-learning environment in Sri Lanka.

Key words-: e-learning, distance education, critical success factors in e-learning, teacher/ instructor role

1. INTRODUCTION

Learning is vital for a prosperous life in the modern world. Among the different modes of learning, e-learning can be introduced as a relatively new and popular mode of learning (Nisar, 2002) in which technology is embedded to a greater extent. With the advanced and powerful technical devices such as desktop computers, laptop computers, television, mobile phones, Internet, e-mail, video conference, etc., traditional learning activities such as face-to-face lectures, homework and assignments have been replaced by e-learning (Costagliola *et al.*, 2005). Availability of electronic and web-enabling technologies (Gunasekaran *et al.*, 2002) and development of network technology (Bose, 2003) have made tremendous influences on the success of e-learning. These changes have caused a revolution in teaching and learning.

Electronic learning, e-learning is defined by various authors in deferent ways. As Horton (2001) defines e-learning as the use of the Internet and digital technologies to create experience that educates fellow human beings. Clark and Mayer (2003) defines e-

learning as instruction delivered on computer by way of CD Rom, Internet or internet that designs to support individual learning or organizational performance goals (Rafaeli *et al.*, 2005). Beamish *et al.* (2002) define e-learning as:

> . . . a wide set of applications and processes allied to training and learning that includes computer-based learning, online learning, virtual classrooms and digital collaboration. These services can be delivered by a variety of electronic media, including the intranet, internet, interactive TV and satellite.

Alternatively a broader definition of e-learning is: any learning activity supported by information and communication technologies. During this study, e-learning will be meant for the distance learning activities which are supported by the information and communication technologies.

While having significant pedagogical benefit, e-learning is becoming a popular mode of learning due to the upward tendency in using information and communication technologies. Present trend in distance education in many parts of the world is an indicator for the acceptance of technology as a method of making education and training more effective and efficient (Abouchedid and Eid, 2004). As far as the case of Sri Lanka is concerned, the e-learning helps expand the learning opportunities, especially in higher education.

At present, there are fifteen national universities operating under the University Grants Commission which is the regulatory authority in higher education in Sri Lanka. The University Grants Commission has given the degree awarding status to a few other institutions, which are not in the university category. Furthermore, there is a number of institutes affiliated or represent foreign universities which offer foreign degrees. Only 3.8% of those who qualify to enter the universities manage to get into bachelors programs because of the limited capacities of the university system, even though 61.27 percent meets university entry requirements (UGC, 2008). The comparative figure for South Asia is 8%. With the purpose of enhancing the learning opportunities at university level, the Government of Sri Lanka has launched a program named "Distance Education Modernization Project (DEMP)" with the financial and technical support of Asian Development Bank (ADB). The DEMP aims to provide a range of quality courses for secondary school graduates who lack in access to conventional national universities by setting up a national network of multimedia-centers. This new system is expected to attract those who are excluded from the conventional university system and provide them with distance learning opportunities. The project aims to develop 100 multimedia-centers nationwide. The project mainly focuses to increase the students' enrollment in the Open University of Sri Lanka, which has been conducting distance education programs since 1984.

A few universities, namely University of Colombo, Open University of Sri Lanka and Rajarata University of Sri Lanka use e-learning for distance education. Open University of Sri Lanka is the pioneer in using e-learning for distance education in Sri Lanka. Open University of Sri Lanka has its own branch-network

island-wide and has been engaging in distance learning from its inception. Further, it has the highest student population among Sri Lankan Universities (University Grant Commission, 2008).

Further, the Government has launched a few other programs such as e-Sri Lanka project, IT Education Project under Ministry of Education etc. with the purpose of enhancing the awareness and accessibility to information and communication technology (ICT). Nenasala Centers also enhance the accessibility to ICT. This demonstrates the commitment and encouragement of Sri Lankan Government in the light of developing ICT infrastructure and encouraging electronic based education in Sri Lanka.

1.1 Rationale of the Study

While taking drastic steps to change and develop the ICT infrastructure with the aim of enhancing learning opportunities in higher education, it is essential to evaluate the success of the steps implemented so far. The modern ICT technologies are introduced for the first time in history to the far away villages. Since those villages did not have access to such technologies by any means in the past, it is essential to critically evaluate and identify the factors restricting the success of the initiatives towards implementing e-learning. This would be beneficial in two ways: directing the success of the existing projects and effective planning of future projects.

Since Sri Lanka has no any prior experience in implementing e-learning programs, the studies which aim to identify factors that influence the success of such projects are vital in

project implementation. E-Learning projects in Sri Lanka especially focus on the implementation of e-learning at university level to enhance the opportunities for higher education, which is salient in developing required manpower for the development of the country.

There are studies which identified how e-learning projects should be implemented; evaluation of e- success of learning; improving productivity of e-learning; evaluating the effectiveness of e-learning, etc. Although there is a contribution from such studies to understand how to implement and manage e-learning development projects, it is impossible to consider the outcome of those studies as a grand rules since the operating environment of Sri Lanka is unique from that of other countries/studies. Therefore, this study attempted to identify the challenges in the form of critical/restraining factors in implementing e-learning in Sri Lanka in distance education programs at university level.

1.2 Objective

The study attempts to find the major factors adversely influencing the successful implementation of e-learning in distance education at Sri Lankan universities and subsequently to propose suggestions and recommendations to overcome adverse effects and to implement e-learning successfully in Sri Lanka.

Therefore the study aims to:
- identify the factors affecting success of e-learning from available literature.
- identify the factors adversely affecting the successful implementation of e-learning in

11

distance education at Sri Lankan University level.

- provide suggestions and recommendations to overcome adverse effects and establish e-learning in Sri Lanka successfully.

1.3 University education in Sri Lanka

Sir Lankan University system consists of fifteen universities, seven postgraduate institutes and nine higher education institutes and they are the institutions that are permitted to offer degree level courses and degrees in Sri Lanka (University Grant Commission, 2008). All of them are operated under a regulatory body, called University Grant Commission of Sri Lanka.

In Sri Lanka, opportunity for university level education is very limited. Out of the university education age group (20-24) only 3.2 percent get admitted to the universities as internal students. Although 56 percent of candidates become eligible for University admission from the university entrance examination (General Certificate of Education - Advanced Level Examination), only 16.53 percent of eligible candidates have the opportunity for university enrollment as internal degree seeking students (University Grant Commission, 2008).

These statistics reveal that university education is limited in Sri Lanka even though candidates are qualified for admission. This situation opens a huge opportunity for external degree programs and distance education programs. The Open University of Sri Lanka is the only university that offers undergraduate education on distance learning basis and it has the highest student enrollment (26 percent of total enrollment) among other universities.

The rest of the fourteen conventional universities share 74 percent only. This indicates the interest of students in university education whenever the opportunities are available. Thus the potential for distance education based on e-learning is huge in Sri Lanka.

1.4 Distance Education and e-Learning

The purpose of incepting distance education was to provide education for those who are unable to attend a conventional classroom-based program (Verduin & Clark, 1991). Distance education may overcome the barriers of capacity of institutions, geography, location (hospital, prison), social responsibilities (child-care, employment), and disability. It further enables the learners for flexible study times which personally suit to the learner, and also it can be adjusted to fit with employment and other commitments (Verduin & Clark, 1991). Verduin and Clark (1991) argue that minimal travel and lack of conflict with work schedules as significant reasons for enrolling in a distance education program. Further, the limited opportunities (capacity) available in education institutions and part-time study opportunities (flexible time) are other-significant reasons for the highest enrollment in distance education programs.

Although the interaction between the teacher and the learner is highly recommended for the effective learning, the conventional distance learning does not allow such interactions. However e-learning approach of learning is different from traditional way of distance education, because of its possibility for teacher-learner interaction. Online interaction can be

synchronous (involve real time interaction) through chat rooms and video-conferencing, or it can be asynchronous (interaction that takes place at different times for different students) through email, websites, and voicemail.

Accordingly, today, with the technology development, e-learning provides avenues for close interactions between the teacher and the learner while providing additional attractive benefits to users.

1.5 Critical Success Factors in e-Learning

Despite its potential benefits, the effectiveness of e-learning in any educational/ training level, environment or institution depends on many factors. This makes it important to identify the factors, which determine the success in e-learning implementation. By reviewing literature on the effectiveness of e-learning program and learning and education, those factors called "critical success factors' can be identified. The 'critical success factors' refer to the factors which are essential in achieving the objectives of e-learning programs and to get benefited. On the other hand, if these factors do not exist, it affects adversely on the success of such projects. Thus, critical success factors are the areas/factors that are mandatory for successful implementation of e-learning; otherwise it leads to ineffective and unsuccessful l-learning projects.

For the successful implementation of e-learning, environment should be consisted number of important characteristics. Poon *et al.* (2004) have identified five factors that affect the

effectiveness of web-based learning in Malaysia. They are:

1. Students' behavior and attitude
2. Technology/system
3. Interactive applications
4. Institutional factors
5. Instructors' characteristics

Combe (2005) presents four key elements of online delivery and importance of integration of them in e-learning projects. This includes curriculum development, the engagement of highly motivated staff, an efficient delivery system, and an innovative course design. Development of a well targeted curriculum is a vital part in developing an effective online course. Well conceived curriculum would not repeat the previous knowledge and experience of learner, and also maintain the interest of the learners. Curriculum should be developed, so that it adds value to the learner by enhancing skills and offering benefits to learners. With well-designed curriculum, success of e-learning programs depends on the quality of the staff.

The teacher plays a vital role in traditional class based learning environment, especially by making interactions. This is true for even e-learning environment. As pointed out by Brown (2002), the favorable dispose of teachers and other supporting staff is crucial. And various types of incentive programs are suggested by Brown (2002) in encouraging teachers. The positive attitudes of teachers towards e-learning make the implementation of e-learning programs successful (Abouchedid and Eid, 2004). Combe (2005) also stressed the importance of having highly motivated teachers and other staff for the success of e-learnng.

Thus e-learning success needs highly motivated employees. Rewards and recognitions play a vital role in this regards.

The above discussions reveal that there are a number of factors that contribute to the success of e-learning programs. After analyzing the ideas presented by various scholars, the role of teacher/ instructor can be identified as one of the critical success factors in implementing e-learning. The existence of effective teacher's/ instructor's role leads e-learning programs to success.

1.6 Role of the Teacher/Instructor in e-Learning

Teachers/Instructors play the disseminators' role and that is one important aspect of the learning process. Because of the transactional distance of e-learning, teacher/instructor's role become more important than in other traditional learning. Thus the effectiveness of the teacher's role determines the success of e-learning.

The teachers'/instructors' interest towards the e-learning is salient in the success of e-learning. Teachers' interest is one of three exploratory dimensions of e-learning (Abouchedid & Eid, 2004). The Institute of Management and Administration (2004) also stated the importance of teacher's role. Instructor's workload is a significant factor that decides the effective involvement of teachers in e-learning (Lemak et al., 2005). Working with the number of e-learners at different geographical areas, responding them in the different time, and visiting the learners are extremely time consuming. The teachers/ instructors, who take the initiatives in e-learning, have to deal with other typical activities in a

university such as student recruitment, researches, consultancy and administration (Brown, 2002). Further the development of learning materials for e-learners also makes teachers/instructors busy. The additional workload entrusted by means of e-learning to teachers/ instructors might reduce the interest in them. Sometimes teachers/instructors might not be willing to accept additional workload and it would affect e-learning programs adversely. With the purpose of encouraging teachers/ instructors, Brown (2002) proposes a reward and recognition system for teachers/instructors. A great attempt is necessary to avoid overloading and to solve the problems of overloading to maintain the interest of the teachers/instructors.

The role of the teacher/instructor changes from disseminator of knowledge to facilitator of learning in an e-learning environment. The success depends on the extent, to which the teachers/ instructors are willing to accept this role change. Teachers should be prepared for this change. As a result, the teacher/instructor training/development programs become an essential element of e-learning (Brown, 2002; Stewart, 2002). Since the foundation of e-learning is technology, technology related training is required to increase the technical skills of teachers. Training may be formal training (basic technical authoring skills using Microsoft Office products and HTML authoring, website development and management, Internet communications and information searching techniques) or informal on the job support (learning objectives, prerequisites, relationship with other courses, assessment strategies, teaching methods, learner characteristics and requirements, media

capabilities). Otherwise, issues would arise because of inadequate skills and lack of understanding on teachers' pedagogical role (Brown, 2002) and technological role. E-Learning is a new field to many teachers/ instructors and they are struggling with developing and implementing e-learning strategies. Although some teachers/ instructors posses required skills, they lack in experience, others' support and particularly technical skills (Macpherson et all., 2005). As mentioned above, training programs with the aim of enhancing the skills and understanding e-learning, should be arranged for teachers/ instructors. This helps maintain the interest of instructors and retain them as well.

At the same time, the teachers' attitude towards e-learning is crucial for its implementation (Brown, 2002). Abouchedid & Eid (2004) identify attitudes as one of three limitations in e-learning implementation. With the modern technology development, especially with the information and communication technology development, there is a trend in accepting the newly developed products/services. However, the attitude towards such development is crucial for the acceptance. With the purpose of measuring the effect of attitudes, Abouchedid & Eid (2004) has utilized an eleven-statement survey and they have used ten-statement survey to assess the benefits gathered from e-learning. Yu & Yang (2005) have used sixteen-point survey to assess the attitudes towards the web-based distance learning among public health sector professionals. With the support of literature, six indicators can be identified in assessing teachers' attitudes. They are: e learning is beneficial; e-learning is not yet developed to replace other form of teaching; e-learning is not effective as face-to-face learning; e-learning adds little to knowledge; e-learning is not conducive to proper evaluation of students; e-Learning methods of teaching is limited.

Therefore, particularly, this study focuses on evaluating three exploratory dimensions of e-learning: the teachers'/ instructors' interest towards e-learning, adequacy of training and learning opportunities to teachers/instructors, and attitudes towards benefits of e-learning.

In concert with the objective of the study, the following research questions will be explored.
- Is teachers'/ instructors' interest a challenge in effective implementation of e-learning?
- Is training and development opportunity a challenge in effective implementation of e-learning?
- Is a teachers' / instructors' attitude towards benefits of e-learning a challenge in effective implementation of e-learning?

2. METHODS

2.1 Target group and sample selection

Since the focus of the study was the implementation of e-learning in Sri Lanka in distance-base undergraduate education, teachers/ instructors of Sri Lankan university system were selected.

Ten lecturers were selected from two universities. One of those universities has already started distance education programs and has taken some of e-learning initiatives. This university was selected since they have experience in e-learning and the project carried out in

15

that university would be a pilot project for implementing e-learning for other universities. The second university accommodates internal-fulltime students and offers traditional degree programs. This university is in the process of implementing e-learning and still at the initial stage. The second university was selected to understand the readiness for e-learning in other universities where e-learning is not yet been implemented. The teachers/ instructors were selected at random and their willingness to be a respondent was considered.

2.2 Questionnaire design

The questionnaire was developed based on the knowledge gathered in the related literature and the studies conducted to gather the perception of individuals on the expected attributes. The questionnaire was developed in two sections. The first section was devoted to gather information on general characteristics of the respondents and the second section was designed to understand the perception of the respondents over the focused attributes of the study.

The questionnaire was a structured questionnaire. It was expected that a structured questionnaire would avoid homogeneous answers and it was convenient to the respondents to select the most appropriate response. The second section of the questionnaire was developed with the likert scale technique and measurement scale was from 1 to 5 with the increasing values according to the increasing agreement.

2.3 Method of survey

The primary data were collected by the structured questionnaire and the researcher helped respondents to understand the questions when it was required. This method was adapted since some respondents found it difficult to understand the questions, especially the ones regarding the modern technologies. This happened because of unawareness of some respondents about some concepts. The method helps ensure the correctness of the answers.

2.3.1 Primary data collection

Primary data collection was carried out by the researcher with the help of the questionnaire. The sample of respondents from the university teachers/ instructors was selected at random considering their willingness to take part in the study.

2.3.2 Secondary Data Collection

The secondary data were collected from following sources.
1. Official websites
2. Publications of organizations (Eg. Ministry of Education, Sri Lanka)
3. Newsletters
4. Annual reports and past research articles

2.5 Data analysis method

On the basis of information gathered from the field survey, analysis was conducted to summarize the opinions of respondents with the aim of deriving the conclusions on the issues/factors that are critical in implementing e-learning in Sri Lanka in distance education programs at undergraduate level. The statistical technique, such as Cronbach's Alpha Coefficient for testing the reliability and mean and standard deviation for summarizing the responses were used for the analysis.

3. RESULTS AND DISCUSSION

The overall Cronbach's Alpha index for the questionnaires was 0.9287. This indicates that the reliability of questionnaire was extremely good. The reliability of the three sub-factors of the study – teachers/ instructors interest, adequacy of training and development, and attitudes towards the benefits – was also good with the Cronbach's Alpha ranging from 0.78 to 0.88.

3.1 Teachers'/Instructors' profiles

The number of teachers/instructors selected for the study was ten. These ten were selected from two universities, five from each. Profiles of teachers/instructors were analyzed in the Table 1. As indicated in the Table 1, 50 percent of the teachers/instructors were below 35 years and 90 percent of them were below 40 years. The sample consisted of quite young teachers compared to the retirement age (65 years) of university academics. The opinion of this age-group would be a key factor in successful future initiatives in term of e-learning and as well as any other development projects.

All respondents had at least a master level qualification and 60 percent had a doctoral degree. This demonstrates the stability (or ability to retain) of the teachers/instructors in their present employment[1] and possibility to expect long term commitment towards the e-learning. Moreover 80 percent of the sample had foreign training either by means of higher education or other short and medium term training. This is an indication of the level of their exposure to the new technology used in education and to the new methods of teaching/learning. This helps them cope with the new initiatives with e-learning, and lead those initiatives and institutions. The majority, 40 percent of the sample was from the science/engineering based faculties and 30 percent each represents commerce/management and art/ humanities faculties.

3.2 Interest of Teachers

Except on the willingness to accept extra workload by means of e-learning, no respondent disagrees on any other statements. Only 10 percent expressed their willingness to accept extra work of e-learning but, majority 60 percent was neutral and 30 percent expressed their disagreement. Respondents showed their interest in web-base teaching (80 percent), designing e-courses (80 percent), using e-books and e-courses (90 percent), in e-mails, video conference etc (80 percent), online search (100 percent) and publishing in e-journals (90 percent). Many respondents were indifferent (80 percent) in their interest in online examinations (see Table 2). The mean analysis also revealed the same result having 3.9 or higher mean value for all the attributes except acceptance of extra workload and interest in online examinations. In general, although respondents disliked to hold online examinations and accept extra work, they showed their interest in all other factors and demonstrated teachers' higher interest in e-learning (mean 3.88 with SD 0.60). Thus, teachers' interest is positive towards e-learning.

3.3 Teacher training and development

None disagreed and 60 percent agreed that they underwent formal training in e-

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[1] In Sri Lanka, university teachers must have at least master qualification to be confirmed in their teaching positions

learning (see Table 3). 70 percent agreed that they had sufficient fund for training in e-learning but only 50 percent agreed on adequacy of training and 10 percent disagreed over that. 70 percent of respondents agreed that they received on the job support informally when and where they were necessary in e-learning projects, but 10 percent disagreed. The mean analysis also confirmed the above results by having means of 3.7 for all

Table 1: Teachers'/Instructors' Profile

Characteristic	Frequency (Respondent)	Percentage (%)
Age		
26-30	2	20
31-35	3	30
36-40	4	40
41-45	1	10
Faculty		
Science/Engineering	4	40
Commerce/ Management	3	30
Highest Education		
Bachelor (only)	0	0
Masters	4	40
PhD	6	60
Foreign Training		
Yes	8	80
No	2	20

the statements except for the adequacy of training on developing e-learning, for which mean was 3.4. Results of the survey on teacher training and development disclosed that the overall

training and development related factors were conducive with the mean of 3.63 and SD of 0.67. However, especial concern was sought regarding training programs on developing e-leaning materials.

3.4 Attitudes on benefits

Responses over the statements regarding the attitudes of teachers towards benefits of e-learning showed that all respondents agreed that e-learning was beneficial to them (see Table 3) while 90 percent and 70 percent of respondents agreed on development of e-learning in Sri Lanka to replace other forms of learning and e-learning adds more knowledge respectively. However, 10 percent of respondents did not agree on statement 3, 4, 5 and 6 (see Table 3). Disagreement over statement 4 was not significant since 70 percent agreed over that. The majority was neutral for the statement 5 and 6 and 40 percent was neutral over statement 3 where 50 percent agreed while 10 disagreed. Mean analysis also confirmed the same results. The means of statement 1, 2 and 4 were 4.0, 3.9 and 3.8 respectively while all other statements showed 3.4 or below mean value. Thus it was clear that statement 1, 2 and 4 were supportive to e-learning while others were not. The overall mean on attitudes towards benefits was 3.58 with SD of 0.533.

As a summary, the overall, 3.69 with the SD of 0.60 indicated favorable teacher/instructor related factors. Teachers fairly agreed on benefits for them and teacher training. All sub factors were favorable while teachers' attitudes towards benefits of e-learning ere the least favorable. Data revealed that teachers had a high level of interest towards e-learning.

Table 2: Percentages of Teachers' Agreement, Mean and Standard Deviation on Teachers' Interest

Statement	Percentage of Agreement			Mean	SD
	1-2[a]	3[b]	4-5[c]		
1. Interest in web-based teaching	0	20	80	3.9	0.57
2. Interest in designing e-courses	0	20	80	4.0	0.67
3. Interest in using e-journals and e-books	0	10	90	4.2	0.63
4. Interest in conducting online examinations	0	80	20	3.2	0.42
5. Interest in communicating by emails, e-conferences etc.	0	20	80	4.3	0.82
6. Interest in conducting online search	0	0	100	4.5	0.53
7. Interest in publishing in online journals	0	10	90	4.1	0.57
8. Accepting additional workload due to e-learning	30	60	10	2.8	0.63

[a] - disagree; [b] - neither agree nor disagree; [c] – agree

Table 3: Percentages of Teachers' Agreement, Mean and Standard Deviation on Teachers' Training and Development

Statement	Percentage of Agreement			Mean	SD
	1-2[a]	3[b]	4-5[c]		
1. Under go formal training	0	40	60	3.7	0.67
2. Availability of funds for training programs	0	30	70	3.7	0.48
3.Adequate training on developing e-learning materials	10	40	50	3.4	0.70
4 Access to informal on-the-job support	10	20	70	3.7	0.82

[a] - disagree; [b] - neither agree nor disagree; [c] - agree

Table 4: Percentages of Teachers' Agreement, Mean and Standard Deviation on Teachers' Attitudes towards benefits of e-learning

Statement	Percentage of Agreement			Mean	SD
	1-2[a]	3[b]	4-5[c]		
1. E-Learning is beneficial to me	0	0	100	4.0	0.00
2. E-Learning is developed to replace other form of teaching in Sri Lanka	0	10	90	3.9	0.32
3. E-Learning is as effective as face-to-face learning	10	40	50	3.4	0.70
4. E-Learning adds more to knowledge	10	20	70	3.8	0.92
5. E-Learning is conducive to proper evaluation of learners	10	60	30	3.2	0.63
6. E-Learning methods of teaching is not limited	10	60	30	3.2	0.63

[a] - disagree; [b] - neither agree nor disagree; [c] - agree

The e-learning mode of learning is salient for Sri Lanka due to limited higher education opportunities. The flexibility of e-learning makes it popular among the potential learners. Out of the number of factors influencing the effective implementation of e-learning, the teacher/ instructor related factors are paramount. Teachers'/ instructors' interest, training and development opportunity, and teachers' / learners' attitude towards benefits of e-learning are prerequisites in deciding proper instructor support and commitment.

Responses to the first question, teachers'/ instructors' interest towards e-learning were favorable. Teachers maintain a higher level of interest in web-based teaching, designing electronic courses, using e-courses and e-books, communicating by emails, e-conferences etc., conducting online research, and publishing in online journals. However, teachers' interest in conducting online examinations and willingness to accept extra workload is comparatively low.

Responses to the second question, teachers' training and development were also favorable. Teachers agreed that they receive formal trainings, and informal on-the-job support. And also, they were satisfied with the funds available. However, teachers were not satisfied with the training on developing e-learning materials.

Responses to the third question, teachers'/ instructors' attitude towards benefits of e-learning were also favorable. Teachers believed that e-learning gives benefits to tem and adds more to knowledge. Further they agreed that e-learning can replace other forms

of teaching in Sri Lanka. However, teachers are indifferent about effectiveness of e-learning as face-to-face learning, and the ability to evaluate learners. And also they have understood the limitation of e-learning.

4. CONCLUSION

The analysis of the impacts of key success factors on implementing e-learning at Sri Lankan universities in undergraduate education was done by responses to the questionnaire. Three major factors, which influence effective implementation of e-learning, were identified.

The results of the analysis and the discussion showed although all three factors are supportive towards effective implementation of e-learning, yet there are rooms for further improvement. It can be concluded that factors related to training and development and teachers' attitudes on benefits have a moderate impact on e-learning implementation. The factors related to teachers' interest has a positive impact on e-learning implementation. However, considering the further development opportunities, following factors can be identified as challenges to implementation of e-learning in undergraduate courses offered as distance education programs at Sri Lankan universities.
- Teachers' less interest in online examinations
- Teachers' unwillingness to accept extra workload
- Hesitation of:
  o teachers in effectiveness of e-learning as face-to-face learning
  o teachers in conducting a proper evaluation online

- Inadequacy of training to teachers in developing e-learning materials

- Teachers' belief that e-leaning is limited.

The existing level of sophistication of above factors should be improved so that the environment becomes supportive to implementation of e-learning in Sri Lanka. Therefore, the necessary steps are sought to improve the prevailing situations of above factors.

Although the study focused on the implementation of e-learning in undergraduate distance education, the government is required to play an important role. This is required since as a policy, education is free in Sri Lanka up to bachelors' education and universities and most of other educational institutions are financed by the government. Therefore, a set of recommendations is given to the government for national level initiatives to improve the prevailing conditions, so that the environment becomes positive towards e-learning implementation. On the other hand, institutions concerned (universities) are also lacking in some of salient aspects that are essential in e-learning implementations. Therefore, a set of recommendations is given to the institutions (universities) so that they make appropriate organizational setting for implementing e-learning.

Followings are the recommendations to the Government

1. Allocation of funds – E-Learning requires a huge investment to build necessary infrastructure and private sector investment cannot be expected at the initial stage. Therefore, the government has to invest on initial projects with the aim of enhancing necessary infrastructure. It is necessary to allocate funds to both institutions, which have already introduced e-learning and which have not introduced with the aim of enhancing the institutions capabilities needed to implement e-learning.

2. Online examinations – The government can introduce online examinations through the Department of Examination. This will enhance the confidence among general public towards online examinations.

3. Establishing a national network – This network would facilitate whoever interested in using it. This would enhance the participation and interest of private sector institutions in e-learning and providing other e-resources like e-library.

4. Providing access to high quality international courses – This would enhance opportunities and the expertise of local professionals by learning through international sources. Thus this would increase the quality of the local e-learning programs and applications.

Followings are the recommendations to the institutions (universities)

1. Training programs and staff development opportunities – Training programs should be implemented with the aim of enhancing the required skills of teachers and other supporting staff in e-learning and ICT technology. Allocation of sufficient funds for such training programs is a responsibility of the respective

21

organizations, and also sustainability of the training program is vital.

2. ICT facilities – ICT facilities should be freely available and accessible. There are facilities such as video conferencing, virtual interactions, digital/e-libraries, media production etc required for e-learning together with Internet.

3. Central resources pool – To help the teachers and other staff who are engaged in e-learning, a central resources pool should be administrated. Thus central resources pool would provide the job support to teachers and other staff.

4. Awareness programs – Universities can organize awareness programs for their employees and as well as for outsiders. This will eliminate the hesitations and suspicions towards e-learning and make it popular among members of the institute and as well as the general public.

5. Rewards and recognition system – Introducing a rewards and recognitions system that rewards the initiatives led by teachers or staff. A rewards and recognition system is essential to motivate teachers and retain them in e-learning. The rewards and recognition system may include: considering initiatives as criteria for promotion; reward involvement in projects with periods of study leave; provide staff with teaching relief to enable personal and materials development; offer financial rewards for development of quality learning resources. This would help to encourage teachers for accepting additional workload entrusted to them by e-learning.

6. Curriculum development committee (CDC) – With the aim of improving the quality of e-learning materials, a CDC should be formed. These committees would look on the course design, incorporation of virtual interactions, online support, instruction and practical work and other curriculum related issues.

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