

# Factors affecting the Use of eLearning Tools in a Student Centered Learning Environment

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**Abstract-** Student centered learning is the modern trend in most of the education institutes. Variety of methods could be useful for learning in such environment. eLearning is one of the methods that could use to acquire knowledge in self-learning environment. Using quantitative approach, a case study was conducted to assess and compare the student's knowledge, attitudes and practice regarding eLearning in a student centered learning environment. This study finds that eLearning becomes more comprehensive and suitable for self-learners with less guidance. However, there are still many problems arise because of the knowledge capabilities, the need for appropriate tools and proper guidance when dealing with eLearning resources that hinder the implementation of self-study environment reforming the traditional class room methods. The problems encountered in the field include: unawareness of technology, unfamiliarity, willingness and the attitudes over changing from traditional to modern eLearning methods and study culture (traditional methods). Some recommendations included such as the proper usage of eLearning tools, guidance over mind set changing, providing relevant and accurate basic knowledge, providing adequate education on the resource usage and introducing the latest eLearning tools to ensure quality study environment.

**Index Terms—** eLearning, self-learning, student centered learning

## I. INTRODUCTION

Student-centered learning is a 21st-century concept adopted by most of educational institutions with the technology and the student's own abilities to achieve higher standards than the traditional learning styles. The new approach is mainly focusing to bring the traditional classroom and students to active life. The teacher/ lecturer is considered a passive entity, assisting and guiding students/learners to meet the goals that have been made by either the students/learner or the teacher/lecturer. This learning structure leads to higher self-esteem, better communication skills, and in unifying students in the diverse, multicultural society they live in.

Mean time the explosion of computers combined with the Internet has brought vast changes in society. On the other hand Electronic communication and digital networks are transforming the way of personal communication and entertainment. This transformation has had a tremendous effect the requirement and opportunity to learn. Along with this great in advancement eLearning has become more popular with the use of Internet technologies to enhance knowledge and performance.

eLearning technologies offer learners control over content, learning structure, pace of learning, time, and media, allowing them to tailor their experiences to meet their personal learning

objectives. This brings the student centered learning through eLearning into one platform.

According to most of the researches eLearning refers to the use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance [1]. These technologies have been developed according to the theories of effective learning and teaching [2]. It is important to identify the effectiveness in eLearning as meeting the goals of the stakeholders who benefit from it. While identifying the importance of effectiveness in eLearning methods and frameworks, most importantly it should be identify the capability of adopting them to a new environment which reforms a traditional method.

In the literature review section of this paper will explain the past concepts and frameworks of eLearning which could be useful in self-learning environment. Methodology section explains the design of the research in finding the appropriateness of eLearning and how it could be adopt into the existing environment with new strategies of technology opportunities.

As an outcome of this paper, the factors affecting to implementation of eLearning will be presented by a framework where any interest party could easily address and apply solutions to improve eLearning to the environment. In conclusion this study suggest a developing infrastructure to support eLearning within the institution which will promote a shift toward adult learning, wherein educators no longer serve solely as distributors of content, but become facilitators of learning and assessors of competency.

## II. OBJECTIVE

The main objective of this research is to identify the appropriate tools and infrastructure of establishing eLearning in student centered environment of the institution. It is mainly because of the immense requirement of the institution in order to improve the quality of learner's environment. Another objective is to identify the potential barriers which effect to the establishment of new environment and also some suggestions to overcome them. The final outcome of this research will mainly focusing on high quality improvement with new eLearning technology tools in new learning environment over traditional method currently the Institution practices.

## III. LITERATURE REVIEW

Student-centered learning is an approach to learning in which learners choose not only what to study but also how and why. This paradigm has encouraged moving power from the teacher/ lecturer to the learner/student, treating the learner/student as a co-creator in the teaching and learning

process. In this method it is important to respect and accommodate individual differences in learners' backgrounds, interests, abilities, and experiences.

In the student-centered environment, the learner requires individualization, interaction, and integration. Individualization ensures that learners are empowered to create their own activities and select their own authentic materials.

Learning is a deeply personal experience: people learn because they want to learn. By enabling learners to be more active participants, a well-designed eLearning experience can motivate them to become more engaged with the content. In such environment learners demonstrate higher achievement when they can attribute success to their own abilities and effort [3]. Interactive learning shifts the focus from a passive, teacher-centered model to one that is active and learner-centered, offering a stronger learning stimulus.

Evidence suggests that eLearning is more efficient because learners gain knowledge, skills, and attitudes faster than through traditional instructor-led methods [4]. Thus blended learning is becoming an approach that combines eLearning technology with traditional instructor-led method with improved motivation and performance [5]. In this changing paradigm, educators no longer serve as the sole distributors of

content, but are becoming facilitators of learning and assessors of competency.

Most researches identified some important principles that an effective eLearning method should support. According to the most of them the effectiveness means satisfying the expectations of learners or anyone who benefited from eLearning. Meanwhile the effectiveness can be measured by mainly concerning the quality of the system, content and the service [6]. Moreover, quality eLearning system should be designed to include outcomes assessment to determine whether learning has occurred [7]. However, as noted above, eLearning requires institutional competencies that go beyond traditional instructional activities. Furthermore, by its nature, eLearning offers learners and instructors the possibility of widespread use, access, and sharing of instruction.

Creating eLearning material involves several components as shown in fig 1: content development, managing the content, method of delivered, and standardized content. Content comprises all instructional material, which can range in complexity from discrete items in various modules. These educational materials such as lessons, modules, or complete courses should be assembled and reassembled around specific learning objectives to meet the requirements of a specified curriculum [8].



**Fig 1 components of eLearning tool**

Content management includes all the administrative functions needed to make eLearning content available to learners. Examples include portals, repositories, digital libraries, learning-management systems, search engines, and ePortfolios. A learning-management system can serve several functions beyond delivering eLearning content. It can simplify and automate administrative and supervisory tasks, track learners' achievement of competencies, and operate as a repository for instructional resources throughout the day [9], [10]. Thus eLearning technologies offer educators a new paradigm based on adult learning theory, which states that adults learn by relating new learning to past experiences, by linking learning to specific needs, and by practically applying learning, resulting in more effective and efficient learning experiences.

The delivery methods of eLearning may be either synchronous or asynchronous. Synchronous delivery refers to real-time, instructor-led eLearning, where all learners receive information simultaneously and communicate directly with other learners. Teleconferencing, Internet chat forums, and instant messaging are most prominent tools used in synchronous delivery method.

In a recent research it states students expect frequent review and feedback at certain time thus it offers best outcomes of the students and make them highly motivated with any type of learning [11]. With asynchronous delivery, the transmission and receiving of information is not concurrent. The learners are responsible for pacing their own self- instruction and learning. The instructor and learners communicate using e-mail or feedback technologies, but not in real time. A variety of methods can be used for asynchronous delivery, including e-

mail, online bulletin boards, listservs, newsgroups, and Weblogs.

In addition to establishing, managing, and delivering of an eLearning system, the eLearning equation is much more important. It is becoming increasingly clear that standards are needed for the creation of new eLearning material [12]. Such standards promote compatibility and usability of products across many computer systems, facilitating the widespread use of eLearning materials. As a result of that eLearning offers the opportunity for educators to evolve into this new role by providing them with a set of online resources to facilitate the learning process.

#### IV. METHODOLOGY

This study was used two distinct phases in collecting data. In the first phase, the quantitative, numeric, data was collected in order to understand the institutional reality, statistics of existing model and level of current context. As the second step, this research conducted a qualitative data gathering and analysis of data collected from participants of eLearning over 6 months of time. In qualitative method, researcher is involved in every step listening to human needs, responsive and adaptive to explore what actually the users in eLearning finds as effective for them [13]. Further this qualitative approach provide better understanding of practical use of eLearning among learners with a live experience.

This study targeted a higher education institute in Sri Lanka which governs under Ministry of Higher Education. The institute intakes students who follow higher education mainly in field of Engineering specializing on three main areas of civil, mechanical & electrical. The sampling size for this study comprised 174 students. As for sampling technique, this study

used judgmental sampling because of the nature of gathering data from an active participants within short time period. The main purpose is among all the other sampling techniques judgmental sampling technique could provide high productivity of responses within short time period [14].

Further with the assist of relevant existing instruments & past literature on data analysis method an instrument was created to analyze the collected data in primary investigation.

Final step was a questionnaire conducted using instrument created in previous step. The instrument of data collection comprised both open- ended and close- ended (structured) questions in order to arrange responses and provide flexibility for answers where applicable. A five-point Likert scale was adopted for the purpose of standardization.

The validity of the scale in this study was ensured because all the items in the instrument were adapted from various scales that had been validated, tested and used.

The analysis of the results will provide the factors which will affect the implementation of eLearning instead of the present learning environment.

**V. DATA ANALYSIS**

- a. Primary data analysis depict the background of participants and the analysis is as below in table 1.

**Table 1 background characteristics of the participants**

Characteristic	Frequency	Valid percent
<b>Sex</b>		
Male	103	59.2
Female	710	40.8
<b>Field of study</b>		
Civil	583	33.3
Mechanical	583	33.3
Electrical	583	33.3
<b>Computer awareness</b>		
High ( followed diploma course)	583	33.3
Moderate ( IT knowledge in School level)	449	25.2
Low ( only know to operate)	728	41.3

- b. Data Analysis based on questionnaire

In the second phase the questionnaire was analyzed after organizing the responses given by participants to the questions. Table 2 illustrates some important factors identified as barriers of migrating to student centered learning method with eLearning tools in this phase. These factors have identified by the key terms of the questions.

**Table 2: Main factors identified in questionnaire**

Affecting factors	Description of the factor
Awareness	Basic knowledge of Hardware support, Software support & Mode of delivery
Familiarity	Knowledge of use most appropriate eLearning tools
Willingness	Does the introducing new technology changed the learner's perception
Usefulness	The relevance of eLearning tools in curricula
Interaction	Does eLearning tool support users to be more active than traditional method
Guidance	Does the eLearning tool support self-learning with less guidance

The descriptive statistics of the responses given in the questionnaire on each factor illustrate in table 3, 4, 5, 6, 7, and 8. The statistics of mean, standard deviation, and variance were obtained for the interval scaled items in each factor with the help of SPSS software package.

A further inspection of the missing data revealed that every participant responded either all or the vast majority of the questions.

Table 3 illustrates the descriptive statistics values obtained in questionnaire. It was identified five supporting characteristics to the main factor.

**Table 3 Descriptive statistics values of Awareness factor**

	Aw are1	Aw are2	Aw are3	Aw are4	Aw are5
N valid	171	171	171	171	171
N missing	3	3	3	3	3
Mean	2.351	2.240	2.509	2.304	2.211
Std Deviation	1.014	0.986	1.129	0.895	0.965
Variance	1.029	0.936	1.275	0.801	0.932
Minimum	1	1	1	1	1
Maximum	5	5	5	5	5

Table 4 illustrates the descriptive statistics values obtained in questionnaire as below. There were four of sub components which consider the existence of familiarity factor

**Table 4 Descriptive statistics values of Familiarity Factor**

	Familiar1	Familiar2	Familiar3	Familiar4
N	170	170	170	170

valid				
N missing	4	4	4	4
Mean	3.517	3.435	3.165	3.471
Std Deviation	1.132	1.082	1.253	1.116
Variance	1.281	1.170	1.570	1.245
Minimum	1	1	1	1
Maximum	5	5	5	5

**Table 5 Descriptive statistics values of Willingness Factor**

	Will1	Will2	Will3	Will4	Will5
N valid	17	17	17	17	173
N missing	3	3	3	3	1
Mean	2.471	2.433	2.462	2.526	2.653
Std Deviation	2.474	2.433	1.014	0.968	1.129
Variance	1.557	1.047	1.029	0.936	1.275
Minimum	1	1	1	1	1
Maximum	5	5	5	5	5

The above table 5 describes the descriptive statistics values for the main factor identified as willingness to change and supportive factors for it.

**Table 6 Descriptive statistics values of Usefulness Factor**

	Use1	Use2	Use3
N valid	173	173	173
N missing	1	1	1
Mean	2.567	2.761	2.792
Std Deviation	0.895	0.965	1.132
Variance	0.801	0.932	1.281
Minimum	1	1	1
Maximum	5	5	5

Table 6 and 7 displays the supporting factors of interaction and guidance of new change environment which was identified.

**Table 7 Descriptive statistics values of Interaction Factor**

	Int1	Int2	Int3
N valid	173	174	173
N missing	1	0	1
Mean	2.792	2.264	3.243
Std Deviation	1.082	1.253	1.116
Variance	1.170	1.570	1.245
Minimum	1	1	1
Maximum	5	5	5

**Table 8 Descriptive statistics values of Guidance Factor**

	Guid1	Guid2
N valid	174	174
N missing	0	0
Mean	2.224	2.161
Std Deviation	2.474	2.433
Variance	1.557	1.047
Minimum	1	1
Maximum	5	5

The next step was to use the instrument to check the validity of the factors affect to the successful adoption of eLearning tools in existing learning environment that were identified in initial step. Cronbach's alpha value was used as the reliability coefficient since it indicates the correlation of items to one another [15].

The SPSS software was used as statistical method to determine the reliability factor of questionnaire.

**Table 9 Reliability Analysis values**

Factor	Reliability Analysis	
	No of questions	Cronbach's alpha value
1. Awareness	5	0.862
2. Familiarity	4	0.715
3. Willingness	5	0.729
4. Usefulness	3	0.842
5. Interaction	3	0.892
6. Guidance	2	0.866

**VI. DISCUSSION**

The theoretical framework of identified factors are illustrates in table 10. It is clearly shown that there is a high

perception among learners to adopt with the eLearning tools in a student centered approach rather traditional method currently practicing.

**Table 10 Affecting Factors for eLearning Tools**

Affecting Factors	Supporting Factors
1. Awareness	Hardware skills Software skills Delivery Method Delivery Mode Delivery Content
2. Familiarity	Learning Environment Industry Recognition Navigation of tools Design structure/interfaces
3. Willingness	Confidence of use Requirement Satisfaction Continuous Attention Peer Collaboration Adopting to New technology
4. Usefulness	Relevance to Subject Getting feedback Review process
5. Interaction	Peer interaction Content interaction Interaction with guider
6. Guidance	Administrative support Physiological support

Adopting eLearning and its technology requires large investments in institute, time, money, and space that need to be justified to administrators and top management. Developments in eLearning and technologies are creating the groundwork for a revolution in education, allowing learning to be individualized by enhancing learners' interactions with each other and transforming the role of the teacher from disseminator to facilitator.

Implementing eLearning techniques in a student centered environment allow educators to revise their content simply and quickly. Learners gain control over the content, learning sequence, pace of learning, time, and media which allows them to tailor their experience to meet personal learning objectives with less guidance. Also learners sense that they could become more active in the learning environment with new technology tools.

Studies in several literature have consistently demonstrated that students are very satisfied with eLearning [16]. It reveals learners' satisfaction is increase with eLearning compared to traditional learning method, along with perceived ease of use and access, navigation, interactivity, and user- friendliness of new approach [17]. Moreover students do not see eLearning as replacing traditional teaching but as a complement to it, forming new method of blended-learning strategy. The results shows enhancement of eLearning tools permit greater learner interactivity meanwhile promotes learners' efficiency, motivation, cognitive effectiveness, and flexibility of learning style.

Further due to the presence of eLearning tools in education streams it breaks isolation of learners in the study environment

and make them more collaborative with peers or groups. On the other hand institutional skills in creating eLearning may differ from those needed for traditional teaching method; therefore institution must recognize these differences and should be address them with adequate solutions. The integration of eLearning into institutional higher education will promote a shift toward adult learning in engineering education, wherein learners become distributors of content, and facilitators of learning.

**VII. LIMITATIONS**

One of the major limitation is that this research accompanied SPSS to evaluate the data under statistical analysis. Another limitation is the that this research aimed only on specific group of students in the institute who represent the part of its population as well it include only the responses of first year academics only. There can be new affecting factors depending on the curricula of other academic years and the experience on the field of specialization.

**VIII. CONCLUSION**

This research aimed on identifying the applicability of eLearning techniques in a student centered learning environment instead of existing teacher centered method. A questionnaire was used to gather data from institutional participants in order to identify the potential barriers to implement eLearning tools in their study environment. It has shown that the students are more likely to be adopt to the new environment rather the traditional method that they used. eLearning offers the opportunity for educators to evolve into this new role by providing them with a set of online resources to facilitate the learning process. The integration of eLearning into existing institutional curricula should be the result of a well-devised plan that begins with a needs assessment and decision to use eLearning within the institution. Also it requires the consideration of some dimensions. For example content, navigation among tools, usability, appropriate level of user, interactivity and necessary skills. The evaluation of eLearning should include a peer-review process and an assessment of outcomes such as learner satisfaction, content usability, and demonstration of learning. Process evaluation need to examine strengths and weaknesses of eLearning tools and the nature of its results. Outcome evaluation could use to assess changes in learners' knowledge, skills, or attitudes towards the environment changes.

The following recommendations could be consider when implementing eLearning technologies within the institution.

- i. The students should educate to use the relevant eLearning tools properly in their academic work.
- ii. Before migrating to the new environment it is important to provide guidance over mind set changing.
- iii. Providing significant and accurate basic knowledge of hardware & software skills.
- iv. Workshops & training sessions should be organized to enhance the quality of new learning method.

**REFERENCES**

[1] Rosenberg M. E-Learning: Strategies for Delivering Knowledge in the Digital Age. New York: McGraw-Hill, 2001.

- [2] Felder Andrew and B Soloman, "Next Generation Learning: Pathway to possibilities," EDUCAUSE, 2013
- [3] North Central Regional Educational Laboratory. (2000). Critical issue: Working toward student self-direction and personal efficacy as educational goals. Available at <http://www.ncrel.org/sdrs/areas/issues/learning/lr200.htm>
- [4] Clark D. Psychological myths in e-learning. *Med Teach.* 2002; 24:598–604.
- [5] Masie E. Blended learning: the magic is in the mix. In: Rossett A (ed). *The ASTD E- Learning Handbook*. New York: McGraw- Hill, 2002:58–63.
- [6] Samantha Samarasinghe and Alexei Tretiakov, "A multi-dimensional measure of e-learning systems success," in *ascilite*, Auckland, 2009, pp. 908-910.
- [7] Gibbons A, Fairweather P. Computer-based instruction. In: Tobias S, Fletcher J (eds). *Training & Retraining: A Handbook for Business, Industry, Government, and the Military*. New York: Macmillan Reference USA, 2000:410–42.
- [8] Littlejohn A. Issues in reusing online resources. In: Littlejohn A (ed). *Reusing Online Resources: A Sustainable Approach to eLearning*. London: Creative Print and Design, 2003:1–6.
- [9] Johnson CE, Hurtubise LC, Castrop J, et al. Learning management systems: technology to measure the medical knowledge competency of the ACGME. *Med Educ.* 2004; 38:599–608.
- [10] Phelps C, Michea YF. Learning management systems' evaluation focuses on technology not learning. *AMIA Annu Symp Proc.* 2003:969.
- [11] H Pashler, "Human Memory and Learning," in *Science of Learning Symposium*, Baltimore, MD, USA, 2014.
- [12] Fallon C, Brown S. *E-learning Standards: A Guide to Purchasing and Deploying Standards-Conformant E-learning*. Boca Raton: St Lucie Press, 2003.
- [13] J Frydenberg, "Quality standards in e-learning: A matrix of analysis," *The International Review of Research in Open and Distance Learning*, vol. 3, no. 2, 2002.
- [14] M. N Marshall, "Sampling for qualitative research," *Family practice*, vol. 13, no. VI, pp. 522-526., 1996
- [15] Michael Quinn Patton, *Qualitative research*, 4th ed.: John Wiley & Sons, Ltd, 2005.
- [16] Jere E Brophy, *Motivating students to learn*. Routledge, 2013.
- [17] Ulf-D Ehlers, "Quality in e-learning from a learner's perspective," *European Journal for Distance and Open Learning*, 2004.