

Original Article

Factors Influencing the Re-Engineering of E-Learning in Teacher Training Colleges in Kenya

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Abstract - E-Learning Frameworks are helpful in gaining a better grasp of how technology, as well as pedagogy operate together. There exists, however, variations in e-learning framework usage. Teacher Training Institutions should do an extensive up-front study to assess their Learning preparedness to profit from e-learning. The purpose of this study was to assess-learning readiness in Teacher Training Colleges. The research objective was to assess factors influencing the re-engineering of E-Learning in Teacher Training Colleges. The study employed a descriptive research design. The sample size was 198 respondents selected using census sampling. Questionnaires and interview schedules were utilized in data gathering. Expert consultation was used in the validity test, whereas Cronbach's alpha was used to test reliability. The data collected was examined utilizing descriptive plus inferential statistics. The findings were used to develop an e-learning framework for Teacher Training Colleges and would enhance e-Learning in teacher training. The findings show a significant statistical influence among content, technological, cultural and demographic factors and E-learning readiness in teacher training colleges in the Western Kenya region. Technology and content readiness were the variables most significant in determining the E-learning readiness in Teacher Training Colleges in the Western Kenya region.

Keywords - E-Learning, Framework, Assessment, Readiness, Public, Teacher, Colleges.

1. Introduction

E-learning is the knowledge delivery passing through electronic media like computers, CD-ROM, Interactive TV, audio/ video tapes, satellite broadcast, internet and intranet [1]. E-learning is delivered in various methods, which is why the authors talk about multiple E-learning frameworks.

E-learning has been adopted in Kenyan universities and colleges to suit its targeted pupils. The availability of networks and internet connections at educational institutions has enabled this. According to [2], based on the online study, Kenyan educational institutions are still far from appreciating E-learning's benefits.

Teacher Training Colleges must be prepared to participate in E-learning systems to improve learning and obtain a competitive edge [3]. To be effective, institutions must conduct readiness assessments to build systems and implement suitable policies. The learner's ability to adapt to technological variations, collaborative training, and asynchronous self-paced education should all be assessed. As e-learning becomes more prevalent in many developing nations with low e-maturity, user readiness evaluation is becoming increasingly important.

Whereas the E-learning significance rests in the capacity to teach anybody, at any time and from any location,

developing and maintaining E-learning programs necessitates more than simply bringing education and learning online [4]. A significant investment in ICT infrastructure is necessary to design, deliver, and administer E-learning programs and train educators to become effective E-learning facilitators. Designing an approach that fulfills both the learners' needs and the institution's goals is critical to a successful E-learning adoption.

2. Literature Review

Hrtoňová, Kohout, Rohlíková and Zounek (2015) conducted a study on the factors influencing the acceptance of e-learning by teachers in the Czech Republic. The survey involved 228 teachers from 68 different primary and secondary schools. These teachers took part in some of the 16 different asynchronous online courses aimed at using modern technologies in education. It was found that the factors with a significant impact on the e-learning course acceptance include the voluntary participation of teachers in the course and the positive expectations held before the course started ($p < 0.001$). Working through the course on one's own and the subjective evaluation of various aspects of the course also plays an important role ($p < 0.001$). The factors which had no statistically significant impact ($p > 0.05$) included the teacher's age, gender, type of school, prior experience with e-learning, individual habits in terms of completing voluntary tasks and taking notes, the involvement



in discussions during the course and the schedule of the course. We conclude that considerable attention should be paid to the psychological aspects of further education of Czech teachers using e-learning [9].

Worldwide, the e-learning market has a growth rate of 35.6%, but failures exist. Little is known about why many users stop online learning after their initial experience. Previous research under different task environments has suggested various factors affecting user satisfaction with e-Learning. This study developed an integrated model with six dimensions: learners, instructors, courses, technology, design, and environment [11]. A survey was conducted to investigate the critical factors affecting learners' satisfaction with e-Learning. The results revealed that learner computer anxiety, instructor attitude toward e-Learning, e-Learning course flexibility, e-Learning course quality, perceived usefulness, perceived ease of use, and diversity in assessments are the critical factors affecting learners' perceived satisfaction. The results show institutions how to improve learner satisfaction and further strengthen their e-Learning implementation [10].

Research on IT acceptance and attitudes guided the specification of independent variables as predictors of acceptance. Survey data were collected from 125 pupils from 8 German high schools in January and July 2005. Results from a three-step hierarchical regression reveal that perceived usefulness was a significant positive predictor of pupils' acceptance, with perceived usefulness of the LMS having the greatest weight. Computer-related attitudes, self-efficacy, and gender had negligible or no influence on acceptance [12].

Electronic Learning (E-learning) uses electronic technology in education via computers and the internet. Despite its slow adoption by faculty members, e-learning provides several benefits to individuals and organizations [13].

Present research and development offer various learning analytics tools providing insights into different aspects of learning processes. Adopting a specific tool for practice is based on how educators perceive its learning analytics to support their pedagogical and organizational goals [14].

M-learning is characterized as a powerful element of learning and education for facilitating learning experiences. With enhanced and rapid advancements in technologies of ICTs (Information and Communication Technologies) and mobile, numerous innovative services and applications are being developed. Therefore, it becomes significant to investigate the factors influencing the intentions of m-learning to be used among the students of higher education institutions [15].

Gender, type, of course, Internet experience, prior experience in e-learning/mixed mode courses and initial proficiency level in e-learning significantly impacted students' intention to enroll for a fully online degree programme. Furthermore, computer self-efficacy, course flexibility and the instructor's attitude were pertinent antecedents to the Perceived Ease of Use predictors of attitude towards e-learning [16].

History tells us that rapid changes bring about many dangers. So, research can help to decrease these dangers. Higher education will be shaping the global landscape in 2025. As global business grows increasingly borderless and labor markets become more seamless, education has become a key determinant of countries' economic performance and potential. Adequate higher education is essential, but the quality and accessibility of secondary and higher education will be even more important for determining whether societies successfully graduate up the continuous improvement ladder. One of these changes in the educational system has been the advent of E-learning, especially Web-based learning. The most pressing challenge in web-based courses is how to increase learning effectiveness, especially for Web-based courses in Iran [17].

Despite e-learning's high profile, it has not been readily integrated into teaching practice in nurse education. Previous research has identified generic, cross-disciplinary factors but has left out 'soft' factors [18].

To facilitate compelling learning experiences for the students, mobile learning (m-learning) has evolved as a powerful component of education - learning and teaching. Unlike electronic learning (e-learning), m-learning uses small and portable devices, laptops, and desktops, primarily small and portable technological tools. M-learning helps impart knowledge focusing on the learner's need, accessibility, infrastructure, and interaction, irrespective of the place and time. With rapid advancements in Information and Communication Technologies (ICT) and mobile devices, myriad applications (Apps) and innovative m-learning and e-learning services are being developed and launched at an unprecedented pace. For students representing different demographics (age, education level, class, socioeconomic status, location) and enrolled in higher education, m-learning has quickly become the modern style and preferred format of learning and accessing knowledge to integrate different learning modes [19].

The attitudes towards computers and the learning subject and the perceived usefulness of the e-learning tool are predictors for learning success. These three variables influenced the outcome variables directly and indirectly via flow experiences and perceived ease of use. Thus, flow plays a crucial role and strongly influences satisfaction and performance [27]. Certain social, organizational, and personal motivational factors, such as the desire to improve

teaching to enhance student learning, was very important in influencing the business teacher educators' computer technology adoption rate.

Both system and instructor factors have significant positive influences on e-learning effectiveness. Learners' computer self-efficacy has a moderating effect on the relationship between system functionality and training effectiveness. The higher the computer self-efficacy, the stronger the relationship between functionality and effectiveness, and vice versa. However, computer self-efficacy does not significantly mediate the relationship between other independent variables and training effectiveness [21].

The effectiveness of e-learning systems is a matter of debate in corporate and academics alike, with researchers viewing it from the course content and instructional design perspective, learner/teacher perspective or delivery medium and technology perspective. We argue that e-learning systems should not consider either of these perspectives in isolation. We analyze the e-learning systems using the socio-technical systems approach, which treats a working system as made up of two jointly independent but correlative interacting systems -- the social and the technical. The technical system involves the processes, tasks, and technology needed to transform inputs into outputs. The social system is concerned with the attributes of people, such as attitudes, skills, values, relationships among people, reward systems, and authority structures. Outputs of the work system result from mutual interactions between these two systems [22].

E-learning leads to introverted-ness, and it is an innovation that must end the interruption of the internet and the electrical current and the lack of knowledge in the use of electronic platforms and the lack of students' possession of smartphone devices and their computers that make the process of e-learning difficult and tiring [23].

With the growing interest in e-education, particularly in the context of the pandemic, more scientific studies have been undertaken recently to analyze and identify factors influencing e-learning acceptance. Indeed, e-learning acceptance depends on many different factors, but no consensus has been reached on the factors that contribute most to the acceptance of e-learning solutions [24].

The sudden outbreak of COVID-19 made universities switch rapidly to e-learning, which enabled continuous access to education. Thus, the evaluation of e-learning engagement is essential to ensure students are engaged in their studies just as it is in the conventional face-to-face classroom. The students are totally in control of their participation in the e-learning platform, and little is known about what instructors can do to facilitate their engagement

in the platform during the COVID-19 pandemic. Similarly, the extant literature has reported that one of the challenges of e-learning is that many university students engage in off-task behaviors during lectures [25].

3. Problem Statement

In this globalization era, it is vital to keep an eye on how prepared institutions are for e-learning and develop a framework which fulfills their requirements. Developing nations have conducted E-learning readiness assessments using adopted frameworks, which has exacerbated the issues encountered by institutions because the frameworks may not be appropriate for their environment [5]; as a result, it would be prudent to construct a framework that may serve as a guide for Teacher Training Colleges in developing nations such as Kenya. Kenya has poor levels of ICT readiness.

Despite the effort by public Teacher Training Colleges to adopt E-learning into their teaching and learning from Frameworks developed in more developed nations, perceptions are still low; they have not been properly adopted. As a result, comprehension, attitude adjustment, and training are still widespread [6].

The persistence of these obstacles and a lack of information about how to utilize ICT in education inhibits public teacher training institutes from being ready for and using E-learning. There further has been fast expansion and ICT investment; consequently, lecturers must be prepared to adopt E-learning in the near future since it is likely to become the form of instruction [26]. Therefore, today Kenya has a high demand for E-learning to try and overcome educational challenges that may hinder learning, such as COVID-19, which paralyzes learning in educational institutions worldwide. By analyzing their cultural, technological, and content readiness, the research will determine the E-learning preparedness of public Teacher Training Colleges' Lectures in Western Kenya areas.

4. Methodology

This study utilized a descriptive research design. The design was chosen because it is meant to generate statistical data on re-engineering an E-learning framework for assessing E-learning preparedness in Kenyan public teacher training colleges.

5. Discussion and Findings

The section set to find out factors influencing E-learning readiness in teacher training colleges in the study area. The expected learning readiness level of 3.4 was adopted from the [8] assessment model to answer the study questions. Any value above this mean signified the level of agreement with the questions asked. Therefore, a T-test analysis was conducted to test whether content, technology, culture and demographic factors influence lecturers' and ICT technicians' E-learning readiness. The findings are illustrated in Table 1.

Table 1. T-Test Analysis on content, technology, culture and demographic factors

Factors	T-Test Values					
	T	Df	Sig. (2-tailed)	Mean Score	95% Confidence Interval of the Difference	
					Lower	Upper
Content	34.459	171	.000	3.86628	3.6350	4.0976
Culture	34.309	171	.000	3.69186	3.4733	4.9104
Technology	34.444	171	.000	3.75000	3.5279	4.9721
Demographic	33.414	171	.000	3.68023	3.4543	4.9062

Table 2. Content Readiness

Content Readiness	Test Value					
	T	DF	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Teaching materials available in E-learning	22.988	171	.000	2.3488	2.1471	2.550
Have attended E-learning training	20.425	171	.000	2.0174	1.8225	2.212
Have basic ICT skills	32.418	171	.000	3.4814	3.1261	3.536
Need more E-learning training	31.770	171	.000	3.5814	3.8927	4.270

Table 3. Institutional Culture in E-learning

	Test Value					
	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Ease to use E-learning tools	29.48	171	.000	3.45442	3.9540	4.3948
E-learning systems are flexible to interact with	34.24	171	.000	3.46442	3.9973	4.3515
E-learning improves the quality of my work	30.76	171	.000	3.97837	3.7993	4.1775
E-learning is useful for research	42.43	171	.000	4.15814	3.8771	4.2392
E-learning is more effective than the traditional classroom-based approach	30.36	171	.000	3.94884	3.6698	4.0279

The results in table 1 indicate that content E-learning factors have a mean of (Mf=3.86628) which is the highest score, culture E-learning factors (Mf=3.69186), technological E-learning factors (Mf=3.75000), while demographic E-learning factors have a mean score of (Mf=3.68023) respectively. The mean for all the variables was above the expected E-learning mean score of (Melr=3.4). Therefore, there was a significant statistical influence between content, technological, cultural and demographic factors and E-learning readiness in teacher training colleges in the Western Kenya region. The findings were in agreement with qualitative data obtained from interviews with the principals, who asserted that various factors influence the implementation of E-learning in colleges that, ranged from technological, content, cultural and demographic readiness.

In regard to content readiness in teacher training colleges, the results are presented in Table 2.

The overall mean of content E-learning readiness (Mlr=2.9<Melr =3.4) was below the average level of readiness. Therefore there is a need to develop E-learning readiness in the study colleges as this shows that the respondents are not prepared for E-learning; even after having basic computer skills, there is a need to carry out more E-learning training. Most principals claimed that content readiness was the driving engine of any system; E-learning readiness is established by content readiness measurement.

Concerning institutional culture in E-learning readiness in the study colleges, the results are presented in Table 3.

Table 4. Institutional Demographic factors in E-learning readiness

	Test Value					
	T	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Male lecturers and ICT technicians appreciate E-learning tools	39.48	171	.000	3.52134	3.9540	4.3948
Female lectures and ICT technicians devote time to E-learning	34.24	171	.000	3.56442	3.9973	4.3515
Young lecturers and ICT technicians are enthusiastic about E-learning	30.76	171	.000	3.87837	3.7993	4.1775
Old lecturers and ICT technicians are using E-learning approaches	42.43	171	.000	4.05814	3.8771	4.2392

The findings in Table 3 show that the lecturers and ICT technicians appropriately use E-learning equipment with a mean of (Mlr=3.45442), which is higher than the expected level of readiness (Mlr=3.45442>Melr =3.4). The findings showed that ease of use of E-learning tools was an essential factor in E-learning readiness. It was further deduced that the E-learning system was flexible to interact with a mean of (Mlr= 3.46442) slightly above the expected level of readiness. It was further noted (Mlr= 3.97837) that E-learning improves the quality of respondents' work. The results also (Mlr= 4.15814) indicated that E-learning was helpful for research, and lastly, the (Mlr= 3.94884) of lecturers and ICT technicians asserted that E-learning allows individuals to complete their tasks more quickly than they might in a traditional classroom setting. The study colleges' cultural e-learning readiness mean score was all higher than the projected E-learning readiness level of (Melr=3.4), indicating that they were ready for E-learning. The majority of principals agreed with the findings, recognizing the factors that influence technology adoption, such as faculty support: equipment availability, instructional design support, resources, staff development opportunities, prompt technical support, incentives, and a strong culture that gives leadership support for new technology while also encouraging risk-taking, mission statement, and culture.

In regard to institutional demographic factors of E-learning readiness in Teacher Training Colleges, the results are presented in Table 4

The findings indicated in Table 4.0 shows that male lecturers and ICT technicians see if they are comfortable with using E-learning equipment with a mean of (Mlr=3.52134); this is higher than the expected level of readiness (Mlr=3.52134>Melr =3.4). Similarly, (Mlr=3.56442) of female lecturers and ICT technicians find it easy to use E-learning tools. It was further deduced that

young lecturers and ICT technicians (Mlr=3.87837) were enthusiastic about the E-learning system, which was above the expected level of readiness. It was further noted (Mlr= 4.05814) that old lectures and ICT technicians use E-learning approaches. The mean score for demographic E-learning readiness variables was all above the expected E-learning readiness level of (Melr=3.4), which showed that the study colleges were ready for E-learning. However, the qualitative data obtained from an interview with the principals indicated that academic rank, service period, age, and gender were not prominent considerations in the decision to use information technology.

6. Conclusion and Recommendations

The findings showed that technology readiness and content readiness had a significant statistical influence on E-learning readiness in the study college. Therefore, they accounted for E-learning readiness in the study colleges, as culture and demographic readiness were not statistically significant in this study. E-learning model readiness was developed. This study established that technology and content readiness were the variables most significant in determining the E-learning readiness in Teacher Training Colleges in Western Kenya. Study analysis indicated that the model explains 98.3% of the respondents' E-learning readiness. This study does not represent the overall picture of the E-learning readiness of Teacher Training Colleges in Kenya as the sample involved was only from five teacher training colleges in Western Kenya region, namely; Eregi, Kaimosi, Kibabii, Bondo, Ugenya and Lugari. Hence, it can give insights into the E-learning readiness among principals, lecturers and ICT technicians in teacher training colleges. Since the model is statistically significant, it can be used by other learning institutions learning from primary schools, secondary schools and institutions of higher education and training.

The following recommendation was made from the study;

- Management of Teacher Training Colleges must come up very fast with a better mechanism for E-learning by making the IT infrastructure and organizing additional training in the E-learning content department.
- Teacher Training colleges should enhance their E-learning readiness as it is a significant factor towards E-learning adaptation
- The model developed out of this study can be used by other learning institutions to assess their E-learning readiness.

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