# Influence of Individual Factors on Effective Adoption of E-Learning in Kenyan Technical Training Institutions: Case of The Kisii National Polytechnic, Kenya

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## Abstract

*In developed countries, e-learning has transformed traditional education into a more adaptable and effective learning environment. But in technical colleges, e-learning is still underutilized and in its early phases of development. Therefore, in developing nations like Kenya, comprehending the crucial elements influencing technology adoption and acceptance is of utmost importance. The purpose of this study was to look into the various individual factors that have contributed to the limited success of e-learning in Kenyan technical training institutes. Kisii National Polytechnic (KNP) was used as a case study. A stratified sampling strategy was used to get data from a sample size of 63. An online questionnaire was used as the data gathering tool. Descriptive statistics was used in data analysis. The research was carried out in July and August of 2021. There were 63 respondents who had registered on the KNP Learning Management System (LMS). Female respondents made up 23.81% of the overall number of respondents on LMS. The attendance rate for LMS training was 74.60%, indicating that the majority of KNP departments had participated. When it came to restricting reasons for using the LMS, internet connectivity (43%) was ranked very low, access to computers as ranked very low (47%), inadequate training was ranked very high (32.0%), and insufficient incentives (38.0%) were ranked high by respondents. Individual factors such as computer literacy were strongly connected to the length of time spent using the LMS, the frequency with which it was used, and the adoption of the LMS. LMS adoption was found to be strongly adversely linked with computer phobia and age. As a result of the findings, adequate computer literacy training, integration of e-learning into TVET strategic plan, improvement of institution ICT infrastructure and the provision of incentives should be addressed to promote adoption.*

**Keywords:** E-Learning, Individual Factors, Effective Adoption

## Introduction

Advances in digital technologies are revolutionizing the practices of training and learning institutions all over the world, and a number of teaching institutions are investing heavily in e-learning and related technology infrastructure development, with high expectations of a strong return on their investment [6]. Despite this investment and effort, trainers and technicians in various academic departments may not always embrace technology in the way that it was meant to in training, and built-in e-learning systems are commonly misused.

It is less expensive to deliver e-learning since it is self-paced, provides consistent information, is faster, and is accessible to learners from any location and at any time [9]. Furthermore, the education materials are easily updatable and allow for multimedia integration, resulting in reinforced learning through the use of audio, video, assessments, and other forms of interaction. The downsides are that it may be expensive to build and that excellent material requires a high level of technical knowledge [9].

At times, e-learning tools can be intimidating, as well as unclear, unpleasant, and costly. In order to keep up with the fast-paced and demanding learning process, e-learning requires additional accountability on the part of trainers and technologists.

Perceived ease of use of information technology has a significant impact on user acceptance and behavior. According to Venkatesh [10], control (internal and external-computer self-efficacy and facilitating conditions), computer joy (intrinsic motivation), and computer anxiety are anchors that predict early perceptions of a novel system's ease of use (emotion). According to his research, users employed the three anchors to create a sense of ease of use for a system that was new to them. A person's high belief in his or her ability to do a certain activity using a computer is referred to as computer self-efficacy.

Wenger [11] asserted that trainee participation is a significant problem for e-learning, and that improving student engagement is a crucial component of learning. It was assumed that incorporating computer-mediated media would boost student participation in both traditional and e-learning environments [1], [3], [5]. Online learner engagement has been defined as a complex activity that takes place both online and offline and involves acting, speaking, thinking, feeling, and belonging [2].

Like other TVET institutions, Kisii National Polytechnic has experienced challenges related to rising demand for tertiary education (a considerable number of enrolments are registered annually) and disruption of training/learning processes due to pandemics such as COVID 19. As a result, most educational institutions have resorted to e-learning to address these difficulties. E-learning offers a variety of advantages over traditional learning methods. Students will be able to use self-paced learning and choose their own learning environments, among other advantages. E-learning is also cost effective since it eliminates the geographical restrictions that traditional classrooms and education frequently have. E-learning helps institutions to enroll more students than they might otherwise due to space and training staff constraints. Kisii National Polytechnic has yet to properly build an e-learning program to supplement traditional face-to-face learning, despite numerous attempts. In order to address and establish a successful implementation plan, this study looked into the specific factors that have influenced Kisii National Polytechnic's successful adoption of e-learning.

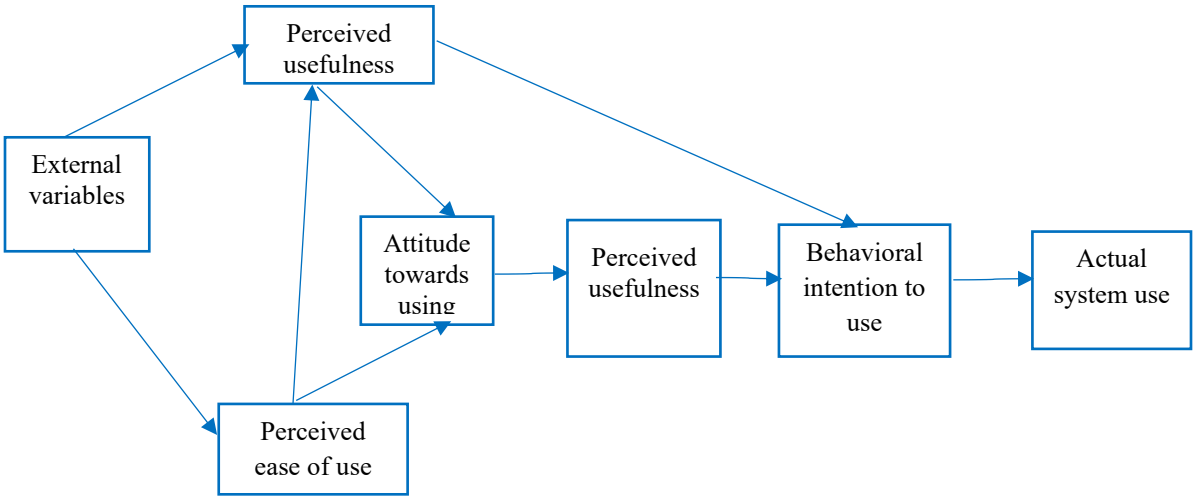


***Figure 1: Figure 1. Source: A Model of Technology Acceptance***

Figure 1 depicts the adoption of e-learning technology, which is explained by the system's perceived utility and simplicity of use. Davis' technology acceptance model (TAM) reveals that the perceived ease of use and utility of a tool by students is explained by anticipated ease of use.

## Study Objective

The objective of the study was to investigate the influence of individual factors on effective adoption of e-Learning in Kenyan technical training institutions.

## Materials and Methods

### Research Design

Kothari [4] claims that research design is the blueprint for the complete data gathering, measurement, and analysis process. From generating the hypothesis and its operational implications to data analysis and making conclusions, the research design provided the framework for everything the researcher did. The research was descriptive in character. Information was gathered through interviews. Individual characteristics were employed as independent variables, with e-learning adoption as the dependent variable. The length of time the respondent had used the LMS and the frequency with which he or she had used the LMS based on the respondent's use of e-learning apps were all utilized to evaluate the e-learning.

### Population and Sample

*Population*

The population in this case relates to the study's subject [8], and it was made up of 85 respondents (trainers and technicians) from eight academic and non-academic departments. Table 3 shows the population distribution for the different departments.

***Table 1: Population Distribution for various departments in Kisii National Polytechnic***

| S/no. | Department | No. of Trainers |
|---|---|---|
| 1 | Agriculture and Environmental sciences | 11 |
| 2 | Hospitality and Institutional Management | 10 |
| 3 | Computer Studies | 21 |
| 4 | Mechanical & Automotive Engineering | 13 |
| 5 | Building & Civil Engineering | 10 |
| 6 | Electrical & Electronics Engineering | 7 |
| 7 | Information Communication & Technology | 4 |
| 8 | Health Sciences | 9 |
| | Total | 85 |

*Source: Kisii National Polytechnic Personnel Registry*

## Sampling Design

*Sampling Frame*

The office of human resources provided the sample frame for the trainers and technicians. Because it was easier to capture trainers and technicians who had already been exposed to and interacted with the technology, or who had previously attended e-learning training, the list of all registered users on the LMS platform under the selected departments was also used as a secondary sampling frame.

*Sampling Technique*

The study used a stratified sample technique since the population being studied was not homogeneous [4]. In the sample, various departments were employed as strata. There were a total of 85 trainers and technicians chosen. The purpose was to gather responses from several departments in order to compare the data and make recommendations based on the findings.

*Sample Size*

The following equation was used to establish the sample size for the research study:

$$n = \frac{z2.\,p.\,q}{e2}$$

Where z represents the standard variate for the specified confidence level (1.96), p represents the sample proportion of successes, q = (1- p), e represents the margin of error, and n represents the sample size [4].

Taking into account a finite population:

$$na = \frac{nN}{n + N}$$

Where n represents the sample size and N the population size.
Assumption: LMS adoption is 20±5%
Therefore, if p = 0.20; q =0.80; N = 85

$$n = \frac{1.96 \times 1.96 \times 0.20 \times 0.80}{0.05 \times 0.05} = 246$$

Adjustment for finite population

$$na = \frac{246 \times 85}{246 + 85} = 63.2$$

To examine their knowledge, attitudes, and experience with e-learning, a representative sample of trainers and technicians from each of Kisii National Polytechnic's eight departments was chosen based on relative distribution. The study enlisted the participation of 85 employees in total.

***Table 2: Sample Size Distribution***

| S/No. | Stratum | Population | Sample Size |
|---|---|---|---|
| 1 | Agriculture and Environmental Sciences (AES) | 11 | 8 |
| 2 | Hospitality and Institutional Management (IM) | 10 | 6 |
| 3 | Computer Studies (CS) | 21 | 15 |
| 4 | Mechanical & Automotive Engineering (MAE) | 13 | 10 |
| 5 | Building & Civil Engineering (BCE) | 10 | 8 |
| 6 | Electrical & Electronics Engineering (EEE) | 7 | 6 |
| 7 | Information Communication Technology (ICT) | 4 | 4 |
| 8 | Health Sciences (HS) | 9 | 6 |
| | Total | 85 | 63 |

**Data Collection Instruments and Procedure**

*Description of Data Collection Instruments and Methods*

A questionnaire was used as the primary data collection instrument. The questionnaire was distributed to the trainers and technicians in the designated departments in order to gather their input on e-learning. The survey was divided into two sections, the first of which was split into two parts. Part I of the first section included demographic questions for trainers and technicians, including gender, age, profile, teaching experience, department, and subject area. The information gathered in Part 1 was ordinal.

Part II of the survey inquired about computer literacy and LMS usage, including respondents' LMS registration status, self-rating of computer literacy abilities, training, and the use of LMS and other e-learning tools for training and learning. Section II contained subsections dedicated to various system components as well as questions investigating the specific aspects that influence LMS adoption. Individual characteristics, as well as personal perspectives such as self-efficacy, anxiety, and computer fun, were taken into account. To determine how staff felt about LMS, all of the questions in those sections contained multiple-item response categories that were fixed to a five-point Likert scale.

The questionnaire, according to Kothari (2004), used a 5-Point Likert Scale to analyze the attitudes of a trainer and technician, where 1 = Strongly Disagree; 2 = Disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly Agree (Table 3.3). Self-reported usage patterns in terms of time and frequency were shown in the third segment. The e-learning adoption index for each respondent was calculated using the following factors: registered LMS users, number of units per department posted on LMS, resources

uploaded, e-learning training techniques used, and length of time using LMS. Each parameter was given a weight, resulting in a total weight of X. The adoption index was then expressed as a percentage. Data was collected using the Open Data Kit (ODK) smartphone application. SPSS (v. 20.0) and MS Excel were used to clean and analyze the data

*Table 3: Scores of a 5-point level Likert scale*

| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

### Data Analysis Plan

ODK, a mobile application, was used to download responses into Excel. After that, the data was coded to make analysis in SPSS (v. 20.0) and MS Excel easier. The data was analyzed using both descriptive (percentages, averages, and frequency counts). The information acquired was presented in the form of appropriate graphs and tables. To address the possibility that some of the constructs mixed multiplicatively rather than additively, stepwise regression analysis was employed to discover any significant two-way interactions.

## Results and Discussion

### Registration on the LMS System

There was a total of 63 respondents who had enrolled on the KNP Learning Management System (100%). Females made up 15 (23.81%) of the LMS users, compared to 48 (76.19%) for males. Table 4 illustrates the outcomes.

*Table 4: Frequency Distribution of Registered Users on LMS by Gender*

| | | **Gender** | | | | | |
|---|---|---|---|---|---|---|---|
| | | **Female** | | **Male** | | **Total** | |
| Question | | F | (%) | F | (%) | f | (%) |
| Are you registered as a user on the KNP e-learning system? | No | 0 | 0 | 0 | 0 | 0 | 0 |
| | Yes | 15 | 23.81 | 48 | 76.19 | 63 | 100 |
| | Total | 15 | 23.81 | 48 | 76.19 | 63 | 100 |

When LMS registration was calculated as a proportion of responders in each department as shown in table 5, computer studies had the highest level (23.81%), followed by Mechanical & Automotive Engineering (15.88%).

*Table 5: Frequency Distribution of Registered Users on LMS by Department*

| | | **Distribution** | | | | | |
|---|---|---|---|---|---|---|---|
| | | **No** | | **Yes** | | **Total** | |
| **Question** | **Department** | F | (%) | F | (%) | F | (%) |
| Are you registered as a user on the KNP e-learning management system? | AES | 0 | 0 | 8 | 12.70 | 8 | 12.70 |
| | IM | 0 | 0 | 6 | 9.52 | 6 | 9.52 |
| | CS | 0 | 0 | 15 | 23.81 | 15 | 23.81 |
| | MAE | 0 | 0 | 10 | 15.88 | 10 | 15.88 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | BCE | 0 | 0 | 8 | 12.70 | 8 | 12.70 |
| | EEE | 0 | 0 | 6 | 9.52 | 6 | 9.52 |
| | ICT | 0 | 0 | 4 | 6.35 | 4 | 6.35 |
| | HS | 0 | 0 | 6 | 9.52 | 6 | 9.52 |
| | Total | 0 | 0 | 63 | 100 | 63 | 100 |

### Attendance of LMS Training

The overall attendance rate for LMS training was 74.60%, indicating that the vast majority of respondents attended an LMS course. When calculated as a proportion of responders in the individual departments, the department of Computer Studies had the greatest level of attendance (23.81%), followed by Mechanical & Automotive Engineering (15.88%) as shown in table 6 had attended training on the KNP e-learning management system.

*Table 6: Frequency Distribution of Attendance on KNP e-learning system Training*

| | | Distribution | | | | | |
|---|---|---|---|---|---|---|---|
| | | No | | Yes | | Total | |
| Question | Department | F | (%) | F | (%) | F | (%) |
| Have you attended any training on the KNP e-learning management system? | AES | 3 | 4.76 | 5 | 7.94 | 8 | 12.70 |
| | IM | 2 | 3.17 | 4 | 6.35 | 6 | 9.52 |
| | CS | 5 | 7.94 | 10 | 15.87 | 15 | 23.81 |
| | MAE | 3 | 4.76 | 7 | 11.11 | 10 | 15.88 |
| | BCE | 1 | 1.59 | 7 | 12.70 | 8 | 12.70 |
| | EEE | 0 | 0 | 6 | 9.52 | 6 | 9.52 |
| | ICT | 0 | 0 | 4 | 6.35 | 4 | 6.35 |
| | HS | 2 | 3.17 | 4 | 9.52 | 6 | 9.52 |
| | Total | 16 | 25.39 | 47 | 74.60 | 63 | 100 |

Agriculture and Environmental sciences department had the lowest attendance of 62.5% although all participants from the eight departments had training attendance of above 60%. The results are presented in table 6

### Factors Limiting Use of the LMS

The respondents' opinions on the most restricting factor for adopting the LMS are shown in Table 4.4. The majority of respondents (43%) assessed computer access as very low, while only 6% ranked it as very high. 17% of respondents ranked internet access as medium and 47% as very low. Similarly, over half of the respondents assessed insufficient training as very high (38%). Almost half of the respondents assessed the lack of time as low (25%). Half of the respondents assessed insufficient incentives as extremely high (32%).

***Table 7: Frequency Distribution of the Most Limiting Factor in Using the LMS***

| | | **Access to Internet** | | **Access to computers** | | **Lack of Time** | | **Insufficient Incentives** | | **Inadequate Training** | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Question | Scale | *F* | % | *F* | % | *F* | % | *F* | % | *F* | % |
| What is the most limiting factor in using the LMS? | Very Low | 27 | 43 | 30 | 47 | 15 | 24 | 5 | 8 | 6 | 9 |
| | Low | 10 | 16 | 13 | 21 | 16 | 25 | 7 | 11 | 9 | 14 |
| | Medium | 11 | 17 | 12 | 19 | 9 | 14 | 9 | 14 | 13 | 21 |
| | High | 8 | 13 | 3 | 5 | 13 | 21 | 14 | 22 | 12 | 19 |
| | Very High | 5 | 8 | 4 | 6 | 10 | 16 | 24 | 38 | 20 | 32 |
| | No Answer | 2 | 3 | 1 | 2 | 0 | 0 | 4 | 7 | 3 | 5 |
| | Total | 63 | 100 | 63 | 100 | 63 | 100 | 63 | 100 | 63 | 100 |

The frequency distribution on computer literacy is shown in Table 8. The majority of respondents (79.4%) evaluated their computer literacy as high to very high (34.9 %).

***Table 8: Computer Literacy***

| | **Frequency** | **Percent (%)** | **Valid Percent** | **Cumulative Percent** |
|---|---|---|---|---|
| Very low | 1 | 1.6 | 1.6 | 1.6 |
| Low | 2 | 3.2 | 3.2 | 4.8 |
| Medium | 10 | 15.9 | 15.9 | 20.7 |
| High | 28 | 44.4 | 44.4 | 65.1 |
| Very high | 22 | 34.9 | 34.9 | 100.0 |
| Total | 63 | 100.0 | 100.0 | |

Only 34.9% of the respondents assessed their computer literacy as extremely high. Only one respondent on the other hand, evaluated computer literacy as very low.

## Discussion of Findings

### Attendance of LMS Training

The overall attendance rate for LMS training was high (74.60%), this indicates that majority of respondents attended to trainees online. For instance, ICT and Electrical & Electronics Engineering departments had 100% attendance, this is because they all attended training on the KNP e-learning management system. This finding agrees with Whiddelt and Nanayakkara, [12] who observed that there was a very strong relationship between the LMS literacy rate of trainers and system adoption.

### Factors Limiting Use of the LMS

Access to internet (43%), access to computers (47%), lack of time, insufficient incentives (32%) and inadequate training (38%) were found to be the major factors that limited use of LMS. This finding agrees with those of Nawaz & Kundi, [7] who reported that high computer illiteracy, low comfort with technologies, inadequate training, lack of commitment and insufficient technical and user support can cause e-learning implementation to fail partially or totally.

## Conclusions

### Conclusions

The most major impediments to e-learning adoption were described as a lack of internet access, lack of access to computers, inadequate training, and insufficient incentives. The majority of respondents used their own broadband modems to access the internet. Despite the fact that KNP departments had outstanding computer literacy, they rarely adopted LMS and e-learning methodologies. This could be due to a lack of LMS training, poor internet access, or management support, among other factors.

The length of time spent using a learning management system, the frequency with which it was used, and the adoption of a learning management system were all found to be highly related to computer literacy, making it key to e-learning adoption. Self-efficacy and computer playfulness were both high, indicating that the departments had individual views about their capacity to execute certain tasks with a computer and a high level of cognitive spontaneity in microcomputer interactions.

The behavioral intention was also high, showing a willingness to use the system, and it was substantially correlated with computer knowledge. Computer playfulness was found to be inversely associated to age, education level, and job title, suggesting that it would be higher in younger departments with fewer educational levels and, as a result, lower job titles.

### Recommendations

The college should incorporate e-learning into its strategic plan in order to strengthen institutional broad e-learning initiatives. This should be handled by the college's upper management, such as the principal and deputy principal academics. E-learning should be incorporated into annual work plans, performance contracts, the creation of a clear strategy, and funding for e-learning activities. Champions should be sought in departments, trained, and equipped to spearhead the implementation as e-learning coordinators.

An ODeL department should be established, and all departments should participate in a computer literacy and LMS training program. It should be made mandatory, especially in departments with a low rate of e-learning uptake. This will improve computer literacy, hence increasing computer playfulness, self-efficacy, and ease of use, as well as lowering computer anxiety, resulting in improved e-learning uptake.

Top management at TVET institutions should devote sufficient resources to ICT infrastructure and guarantee that the ICT department invests more in fast and reliable internet connectivity as well as a dedicated and mirrored server to host an e-learning platform. This will provide efficient and stable connections, improve LMS user experience, and prevent content loss on the system. Other cost-effective solutions, such as cloud hosting, should also be investigated. As a result, upgrading the ICT infrastructure will increase system utilization and, thus, increase e-learning uptake.

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