

Learning Outcomes of the Usage of E-learning Systems in TVET during COVID 19 Pandemic: The Case Study of Kenya Technical Trainers College, Kenya

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Abstract

Learning outcomes is a key concept in the design of e-learning system usage in Technical and Vocational Education and Training (TVET). The COVID-19 pandemic has introduced uncertainty into major aspects disrupting the education sector landscape limiting students' ability to access learning across the country, which greatly affected their learning outcomes. In response to the Covid-19 pandemic, there are significant shifts towards e-learning usage across the education sector to enhance trainee equality, inclusivity, transferability and recognition of qualifications at different levels to achieve better future learning outcomes. Therefore, the paper focuses on the learning outcomes of the usage of e-learning systems in TVET during COVID-19 Pandemic with an objective to establish the trainee's learning outcomes in the e-learning system adoption and use in the TVET system. A case study of Kenya Technical Trainers College (KTTC) was adopted with the target population of 118 school-based advanced diploma technical teacher business education trainees. The objective of the study was to determine the trainee's learning outcomes from e-learning system adoption and use in enhancing trainee equality and inclusivity in the TVET system in the era of a COVID 19 pandemic. The study employed a descriptive survey design. Questionnaire as the primary data collection instrument was employed to a sample of 91 school-based advanced diploma technical teacher business education trainees, analyzed quantitatively and qualitatively, and presented using frequencies in tabular form. The study found out that while trainees appreciated learning that leveraged appropriate e-learning technologies as certainly desirable, it did not necessarily affect trainees learning outcomes. The study concluded that learning assistance outcomes and academic performance outcomes are not certainly influenced by e-learning system adoption and use in the TVET system. The study recommended that the increased usage of e-learning systems might not lead to more effective learning outcomes, thus, efforts should be put into designing courses utilizing e-learning systems so that the trainees can learn effectively to achieve their learning outcomes.

Key words: *COVID-19, e-learning system, usage outcomes, TVET*

Introduction

The COVID-19 pandemic crisis had a direct impact on education not only at the international level but also at the national level that had not been previously imagined (Agnoletto & Queiroz, 2020). Kenya was not an exception, and it confirmed its first case of COVID-19 on 13th March 2020 and the cases have continued to steadily rise and spread across the country. This has led to the adoption of teaching and learning using e-learning systems in Technical and Vocational Education and Training (TVET). It is replacing the traditional classroom environment worldwide, hence, is a crucial source to continue educational activities (Alhumaid et al., 2020). However, its relevance is questionable if the use of the e-learning system itself is not associated with its learning outcomes. E-learning system usage has come because of rapid growth and popularity in the internet, distance education, and more so the COVID-19 pandemic crisis that has made online education grow rapidly (Dhawan, 2020). Greater learning control by trainees leads to better learning outcomes, which suggests that a useful e-learning system may increase trainees' control of the learning process and eventually affect learning outcomes. Generally, it provides results in favour of its usefulness, effectiveness, and positive influence on student's performance (Islam, 2011). On the other hand, extended online interrupts learning that disengages trainees from the process has the potential cost of reversing gains in learning results (Ngwacho, 2020). To understand the outcomes of the usage of e-learning systems in TVET during COVID 19 pandemic, an address on the learning systems adoption and its learning outcomes is essential. This study, therefore, examines the learning outcomes of the usage of e-learning systems in TVET during COVID 19 pandemic.

Learning outcomes are expressions of the knowledge, skills and abilities that each trainee should have and which they can demonstrate after completing the learning experience or learning experience sequence (Lesch & Brown, 2012). COVID 19 has disrupted the education sector landscape limiting students' ability to access learning across the country, which greatly affected their learning outcomes. This weighed heavily on the areas of learning that trainees have been least able to access by failing to recognize the natural variation in students' strengths across a broader range of skills, or "patterns of thoughts, feelings, and behaviour (Kathula, 2020). This is supported by the social network theory that argues that students interact more effectively when a social structure enables them to access a larger base of contacts and makes the exchange of information faster, which may allow them to learn effectively in classroom situations hence better learning outcomes (Ortiz, Hoyos & Lopez, 2004). Learning outcomes can be defined by learning assistance outcomes and academic performance outcomes. Learning assistance outcomes are determined by both the extent to which the course interface is well organized and easy to navigate (learning effectiveness outcomes), and the effectiveness of interpersonal interaction in reinforcing course content and objectives (student interpersonal interaction)

On the other hand, academic performance outcome evaluates whether the course clearly outlines course-level and unit-level objectives (course commitment), and the clarity of learning objectives and performance standards along with clear expectations for assignments (learning objectives and assessments) (Islam, 2011).

E-learning usage is the adoption of technology to enhance teaching and learning activities with the main purpose of increasing accessibility of education, cost reduction, productivity equality and inclusivity (Thomas, 2016). Large-scale, national efforts to utilize technology in support of remote learning, distance education and online learning during the COVID-19 pandemic are emerging and evolving quickly (Fairlie & Loyalka, 2020). According to Pituch, and Yao-kuei (2006), a useful e-learning system may increase students' control of the learning process and eventually affect learning effectiveness and contains many features that help the participants collaborate. Salomon (1994), explains better in his symbol system theory that different media symbol systems impact information delivery and learning effectiveness. The core of the symbol systems theory is that whether a media can effectively help effective learning depends on the degree of matching between the symbol systems and learners' learning contents and activities. E-learning is covered under a larger term of technology-based learning through websites, learning portals, video conferencing, YouTube, mobile apps, and a thousand types of free available websites (Shahzad et al., 2020).

TVET institutions provide avenues for acquiring the skills and knowledge through technical and professional education that are the engines of any country both social development and economic growth (Goel, 2010). The Kenya technical trainers college (KTTC), is a government institution under the ministry of higher education, Science and Technology established with the primary objective of training technically skilled personnel, to not only teach in technical institutions but, also for employment in all sectors of the economy. With a capacity of more than 4000 trainees enrolled, 118 trainees are enrolled in a School-based programme, advanced diploma in technical teacher business (with various specialization) education (KTTC, 2021).

Statement of the Problem

Learning outcomes is a key concept in the design of e-learning system usage in Technical and Vocational Education and Training (TVET). The COVID-19 pandemic has introduced uncertainty into major aspects disrupting the education sector landscape limiting students' ability to access learning across the country, which greatly affected their learning outcomes. In response to the Covid-19 pandemic, there are significant shifts towards e-learning usage across the education sector to enhance trainee equality, inclusivity, transferability and recognition of qualifications at different levels to achieve better future learning outcomes.

Teachers' perceptions regarding online learning as a substitute for formal education were focused on but not the learning outcomes of the usage of e-learning systems in TVET during COVID 19 pandemic.

Furthermore, Pakistan was used as the context of the study rather than Kenya Technical Trainers College (KTTC), Kenya. Kathula (2020), did a study to determine the effect of the COVID-19 pandemic on the education systems in Kenya. The study however fails to consider the associated learning outcomes on the adoption of an e-learning system in TVET. However, based on the existing studies that have been carried out, none has taken into account to determine the learning outcomes of the usage of e-learning systems in TVET during COVID 19 pandemic in Technical and Vocational Education and Training (TVET). To fill the gap, this research paper addresses to determine the learning outcomes of the usage of e-learning systems in TVET during COVID 19 pandemic in the TVET system.

Purpose and Objective of the Study

The main aim of this study was to determine the learning outcomes of the usage of e-learning systems in Technical and Vocational Education and Training (TVET) during COVID 19 pandemic in Kenya Technical Trainers College, Kenya.

Specific Objectives

- a). To determine the influence on trainees' learning effectiveness on the usage of e-learning systems in TVET during the COVID-19 pandemic in Kenya Technical Trainers College.
- b). To determine the influence on trainees' interpersonal interaction on the usage of e-learning systems in TVET during the COVID-19 pandemic in Kenya Technical Trainers College.
- c). To establish the impacts on trainees' course commitment on the usage of e-learning systems in TVET during the COVID-19 pandemic in Kenya Technical Trainers College.
- d). To assess the effects on learning objectives and assessments on the usage of e-learning systems in TVET during the COVID-19 pandemic in Kenya Technical Trainers College.

Significance of the Study

Contribute to the growing knowledge on Coronavirus's effect on the education sector and the need for technology in education.

Assist educational planners, educational policymakers, e-learning system designers and other interested parties in planning and making appropriate decisions in matters of learning outcomes on the use of e-learning systems in the TVET sector during the COVID-19 pandemic. This study will also help trainees (researchers) to address matters involving improving their knowledge resulting in effective learning outcomes on the adoption of an effective e-learning system.

Literature Review

Ease of access and positive learning outcomes has resulted due to increasing online learning adaptation. Even in crises for instance in the recent COVID pandemic 19, online learning provides unhindered learning and education opportunities to the students (Alhu- maid et al., 2020). In this regard, (Latifah & Thirumeni, 2016) examined the uses of online learning management systems for undergraduate students at Open University Malaysia. Students' satisfaction and positive impacts on their academic performance were the two most prominent outcomes of preferring online learning. The majority of respondents demanded an increased technology integration in distance education to avail more outcomes that are significant.

Furthermore, (Habes et al., 2019) scrutinized the impact of students learning performance of the acceptance of the e-Learning system in Amman, Jordan. The findings indicated that the respondents expressed better academic performance and learning outcomes due to e-Learning acceptance and integration. Moreover, perceived ease of use and usefulness were the two leading mechanisms supporting e-Learning adaptation and usage. The study would contribute to the growing knowledge on COVID 19 effect on the education sector's learning outcomes and the need for technology especially on trainees' e-learning system usage in TVET.

While evaluating the impact of COVID-19 on education in Kenya Njenga (2020) indicated that with close to 10,000 private primary and secondary schools in Kenya, the closures present unique challenges in running their learning operations. The government of Kenya through the Kenya Institute of Curriculum Development (KICD) stepped up measures to facilitate learning through e-learning systems using different platforms such as the Kenya Education Cloud, TV, radio, ed-tech apps, and mobile phones. These modes of learning although effective may only benefit a few students who have access at home to computers, smartphones, and the appropriate technology. Learners' learning outcomes are likely to be affected for this may further widen the education outcome inequality gap, inequity, access and quality of education.

Thus, the e-learning system may assist students by helping them to learn more effectively and by allowing them to build a social network. Such benefits may help students improve their academic performance (Gikas & Grant, 2013).

Sintema (2020) hypothesized that COVID-19 would negatively impact the general performance of students in the 2020 Grade 12 national examinations vis-à-vis mathematics, science and design, and technology subjects in secondary schools in Zambia. Though e-learning system usage was not focused on the study, it revealed that there is likely to be a drop in the pass percentage of secondary school students in this year's national examinations if the COVID-19 epidemic is not contained in the shortest possible time. Learners' learning outcomes are likely to be affected. Unplanned Institutional closures negatively affect learners' learning outcomes (Ngwacho, 2020). Being in School provides vital learning and when institutions abruptly close, learners and youths are dispossessed chances for growth and development. The study would contribute to assist educational planners, educational policymakers, e-learning system designers and other interested parties in planning and making appropriate decisions in matters of learning outcomes on the use of the e-learning system during the COVID-19 pandemic. Perceived learning assistance is significant directly impacted (although very weak) by the use of e-learning systems. Though not empirically tested in prior literature, there is ample evidence of support for this finding. For example, it is often argued that higher learning outcomes can be achieved by replacing some of the in-class activities with e-learning as compared to traditional face-to-face learning (Kemp & Grieve, 2014).

Although students and educators are physically separated in an e-learning environment, it has been argued that students' engagement is greatly increased in such a learning environment (Northrup, 2001). Increased student engagement can improve learning outcomes, such as problem-solving and critical thinking skills (Liaw, Huang & Chen, 2007). Individuals are assumed to learn better, when they discover things by themselves and when they control the pace of learning (Leidner & Jarvenpaa, 1995). This implies that the use of e-learning systems in the courses provides some sort of self-directed learning opportunities, which lead to the improvement of learning effectiveness among the students. Additionally, online activities should provide students with the opportunity to become better acquainted and share their common interests about a particular topic more deeply. It may even be that many students become more active in the online social medium of instruction in comparison with face-to-face situations (Islam, 2011).

Methodology

A descriptive survey research design was used to conduct the study, as it was appropriate and enabled the researcher to gather facts and generalize the findings to a population. It allows analysis and defines the relation of variables on the learning outcomes of the usage of e-learning system in TVET during COVID 19 pandemic in Technical and Vocational Education and Training (TVET) in Kenya Technical Trainers College, Kenya

Trainees on school-based advanced diploma technical teacher business (with various specialization) education trainees form the study target population for there are useful in providing collaborative information on the problem of the study. Therefore, enrolled 118 trainees of Kenya Technical Trainers College form the target population of the study. For the study, a simple random sampling technique was used to collect data. Sampling is a procedure, process, or technique used to select a sub-group from a population to participate in a study (Ogula, 2005). A sample is a smaller group or sub-group obtained from the accessible population (Mugenda and Mugenda, 2003), therefore, a sample of 91 respondents from a total population of 118 forms the sample size population of the study (Krejcie and Morgan).

Questionnaires were used for the study. According to Owens (2002), questionnaires have the potential to reach a large number of respondents in a short time, give respondents sufficient time to answer the questions, respondents give a sense of security, as an objective method there is no bias due to personal characteristics. Descriptive statistics were calculated and the study results were presented using tables, percentages and interpretations made.

Findings

Findings of the study established on the learning outcomes of the usage of e-learning system in TVET during COVID 19 pandemic in the TVET system were presented with the respondents requested to rate their responses according to YES, UNSURE and NO. Data collected were presented in tabular form, percentages were computed on the data and interpretations were made as shown in the table below

Table 1

Analysis of the Learning Outcomes on the usage of E-learning Systems in TVET During COVID 19 Pandemic in the TVET System

	N	Yes	Unsure	No	Total
The influence on trainees' learning effectiveness by the usage of e-learning systems in TVET during the COVID-19 pandemic	N	29	35	27	91
	%	0.32	0.38	0.30	1
The influence of trainees' interpersonal interaction by the usage of e-learning systems in TVET during the COVID-19 pandemic	N	32	31	28	91
	%	0.35	0.34	0.31	1
The impacts on trainees' course commitment by the usage of e-learning systems in TVET during the COVID-19 pandemic	N	33	29	29	91
	%	0.36	0.32	0.32	1
Effects on learning objectives and assessments by the usage of e-learning systems in TVET during the COVID-19 pandemic	N	27	33	31	91
	%	0.30	0.36	0.34	1

The Influence on Trainees' Learning Effectiveness

Results showed that 32% of respondents agreed that trainees' learning effectiveness was influenced by the usage of e-learning systems in TVET during the COVID-19 pandemic. Thirty eight per cent of the respondent were not sure while 30% of the respondent confirmed that trainees' learning effectiveness was not influenced by the usage of e-learning systems in TVET during the COVID-19 pandemic. This confirms that the effective enabling extent to which the course interface is organized and navigated resulting from the utilization of an e-learning system does not necessarily bring benefits to trainees during the COVID-19 pandemic. This was contributed by the fact that Moodle sites work best when the trainers put timely and valuable information. Islam (2011), noted that such effective utilization largely depends on an educator's capabilities to build an effective learning environment with the students.

The Influence on Trainees' Interpersonal Interaction

Data shows that 35% of the respondent agreed that trainees' interpersonal interaction was influenced by the usage of e-learning systems in TVET during the COVID-19 pandemic. Thirty four per cent of the respondents were not sure while 31% of the respondent did not agree that trainees' interpersonal interaction was influenced by the usage of e-learning

systems in TVET during the COVID-19 pandemic. This reveals that trainees' interpersonal interaction results from the utilization of the e-learning system do not necessarily bring benefits to trainees during the COVID-19 pandemic. This agrees with the findings by Islam (2012) that predicted a significantly although very weak perceived learning assistance in the sense of maintaining working relationships and informal communication through perceived ease of e-learning system usage. Islam, (2012) asserts that online activities should provide students with the opportunity to become better acquainted and share their common interests about a particular topic more deeply.

The Impact on Trainees' Course Commitment

The majority of the respondent 36% agreed that trainees' course commitment was impacted by the usage of e-learning systems in TVET during the COVID-19 pandemic. 32% of the respondent are both unsure and did not agree that trainees' course commitment was impacted by the usage of e-learning systems in TVET during the COVID-19 pandemic. This implies some sort of self-directed learning opportunities (course commitment) with the adoption of e-learning systems, which lead to the improvement of learning effectiveness among the students (Leidner & Jarvenpaa, 1995). The study agrees with the findings by Zainuddin and Kamaluddin (2012) that an online learning environment offers an array of obstacles and opportunities on students' course commitment that must be attended for the effective integration of online strategies to be successful.

Effects on Learning Objectives and Assessments

Data shows that 30% of the respondent agreed that learning objectives and assessments was affected by the usage of e-learning systems in TVET during the COVID-19 pandemic. 36% of the respondent are not sure while 34% of the respondent did not agree that learning objectives and assessments were affected by the usage of e-learning systems in TVET during the COVID-19 pandemic. This might be argued that the trainees may not have use learning objectives to develop strategic approaches to learning and assessment preparation, leading to a mismatch between the academic's intended learning approach and the student has used learning approach. Lawson (1974) asserts this by identifying that the effects of the degree of specificity of the degree in learning are that, various instructional conditions determine the efficacy of utilizing learning objectives to promote learning and retention.

Conclusion

The study concludes that the effective enabling extent to which the course interface is organized and navigated resulting from the utilization of an e-learning system does not necessarily bring benefits to trainees during the COVID-19 pandemic.

The effective enabling extent to which the course interface is organized and navigated largely depends on an educator's capabilities to build an effective learning environment with the trainees. Trainees' interpersonal interaction results from the utilization of the e-learning system do not necessarily bring benefits to trainees during the COVID-19 pandemic. Therefore, e-learning activities should provide trainees with the opportunity to become better acquainted and share their common interests about a particular topic more deeply. Some sort of self-directed learning opportunities (course commitment) with the adoption of e-learning systems leads to the improvement of learning effectiveness among the students. To achieve trainees learning outcome course commitment must be attended although the effective integration of online strategies should be enhanced. Finally, the trainee may not use learning objectives to develop strategic approaches to learning and assessment preparation, leading to a mismatch between the academic's intended learning approach and the trainee who has used the learning approach. Various instructional conditions determine the efficacy of utilizing learning objectives to promote learning and retention.

Recommendations

Considering the changing learning environment in the TVET sector and the need to enhance creativity and innovations in learning to achieve effective learning outcomes during the COVID-19 pandemic, the integration of emerging technologies as e-learning system usage in education is no longer a choice, but a need for all educators. To affect trainees' learning outcomes, e-learning system designers, educators and school management need to develop e-learning systems that are useful and easy to use. They should put effort into designing courses utilizing e-learning systems so that the trainees can learn effectively to achieve their learning outcomes. For example, by adding different functionalities to the course pages and encourage the trainee to use them through announcing some incentive, such as the possibility to earn some bonus points for active participation so that the students can learn effectively.

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