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IMPLEMENTATION OF ONLINE EDUCATION IN TECHNICAL AND VOCATIONAL COLLEGES IN KAKAMEGA COUNTY, KENYA.

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Abstract

Education and its role in the development of individuals and society is one of the key factors to the economic prosperity of any nation. Education is primarily delivered using the traditional approach such as face to face learning, however, learning is increasingly being delivered via use of technology devices for instance online learning or blended learning. Therefore, this study focused on the factors affecting implementation of online teaching and learning in enhancing education in the Technical and vocational colleges in Kakamega County, Kenya. Four research questions were used to guide the study. They include: What is the attitude of the trainers towards online teaching and learning? What is the attitude of the trainees towards online teaching and learning? How adequate are the online teaching and learning resources to support quality teaching and learning in technical and vocational institutions in Kakamega County? What is the level of effectiveness of online teaching and learning in enhancing education in the technical and vocational institutions in Kakamega County? This study adopted the theory of diffusion of innovations. The study employed a mixed method research approach whereby the study targeted 4 Principals, 1 County Director of Education, 230 Trainers and 6610 Trainees from the technical and vocational institutions in Kakamega County. Purposive sampling was used to select the 4 Principals of Technical and Vocational Colleges and 1 County Director of Education while simple random sampling was employed to select 373 respondents (Trainers and trainees) in the 4 Technical and Vocational Colleges. Quantitative data were obtained through the use of questionnaires, while qualitative data were gathered using interview guides and document analysis guides. Quantitative data was analyzed using descriptive statistics and inferential statistics where descriptive statistics included frequencies and percentages while inferential statistics involved Pearson correlation analysis. On the hand, qualitative data was analyzed using a content analysis technique. The study concluded that attitude of the trainers and trainees had influence on the quality of online education. Also, the study concluded that adequacy of learning and teaching resources had influence on the quality of online education. Moreover, the level of effectiveness of online teaching and learning had effect on the quality of online education. The study recommends that there is need for the management of the TVC in Kakamega County to have a changed perception on the online education. This will assist in the adoption and implementation of online education in the various TVC in the county. The management of the TVC's in Kakamega County should ensure that the online teaching and learning materials such as tablets, desktop computer, copy scanners, overhead projectors and internet connections among others are available to enhance the online education. The management of the TVC's in Kakamega County should ensure that the available resources are utilized correctly and this can assist in achieving its goal on the online education. This will also improve on the quality of online education in the TVC's within the county

Keywords:

Online Education; Trainers Attitude; Trainees Attitude; Adequate Online Teaching and Learning Resources; Effectiveness of online teaching and learning

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1. Introduction

Green procurement, according to Coddington (2013), is the purchase of products or services that have a lesser Technical and Vocational Colleges (TVC) institutions are responsible for offering programs that equip the graduates with quality and relevant skills and competencies to meet the needs of the labor markets. It is under the Directorate of Technical and Vocational Education and Training.

Kenya is among the countries hardest hit by unemployment, with 70 per cent of the unemployment being young people. This clearly shows that unemployment in Kenya affects youth hardest and our challenge as a country is to take advantage of the growing numbers of youth capital. If we can place them to work, Kenya would experience unmatched economic growth.

Although Kenya has made good progress in technical and vocational education by supporting TVET institutions, the work is far from over. Over time, industry demands have evolved as the structure of Kenya's economy has changed, to both labor-intensive and skill-intensive industries, and now, increasingly towards an innovation-intensive future.

Education and its role in the development of individuals and society is one of the key factors to the economic prosperity of any nation. Education is primarily delivered using the traditional approach, i.e., face to face learning, however, learning is increasingly being delivered via online learning or blended learning. Understanding the role of online learning, as a tool for rapid and broad development of tertiary education, is a basic requirement; especially for developing countries. Online learning has gained much attention from researchers across a range of diverse cultures and contexts (Lin, 2010); with many researchers extolling online learning over traditional learning for its advantage of being used in a blended mode (Zengin, Arikan, & Dogan, 2011). Online learning facilitates remote students with the opportunity to interact with experienced teachers or professors (Yao, Wang, Jiang, Li & Li, 2022), which has resulted in significant demand; especially in developing countries. The robust growth of online learning is making academicians and practitioners focus on antecedents and consequences of its successful implementation (Lee, Yoon, & Lee, 2009). Undoubtedly, online learning has numerous advantages like interactivity, personalized instruction and independent learning (Flores, Ari, Inan, & Arslan-Ari, 2012), but at the same time, there are many problems in the adoption of online learning (Park, 2009). Despite the wide range of features and benefits, online learning is facing a lot of implementation barriers.

1.1 Statement of the problem

Online education has been incorporated into many educational institutions in order to reap the benefits of rapid technological advancements that aid in improving the learning experience and increasing its efficacy. Significant progress has been made in online learning over the last few decades, with the rate of adoption in educational institutions exceeding 35% in developed countries. (Al-Marabeh and Mohammad, 2013).

Predominantly, when a new system is introduced, a better understanding of the factors influencing its implementation and development will lead to better development, deployment, and implementation. Similarly, careful consideration of the factors influencing online teaching and learning implementation is necessary to avoid the failure of E-Learning projects (Salmon, 2005).

Despite, the emergence of technology in education there has been various issues that affects its implementation in many institutions in Kenya. In this view, the study seeks to find out on the factors affecting the implementation of online teaching and learning in enhancing education in the technical and vocational colleges in Kakamega County, Kenya.

1.2 Research Objectives

The research objectives are as follows;

1. To determine the trainer's attitude in the implementation of online teaching and learning in TVC in Kakamega County
2. To determine the trainees' attitude in the implementation of online teaching and learning in TVC in Kakamega County.
3. To find out the adequacy of the online teaching and learning resources to support the teaching and learning in TVC in Kakamega County.
4. To establish the level of effectiveness of online teaching and learning in enhancing education in TVC in Kakamega County.

1.3 Research Questions

1. What is the trainers' attitude in the implementation of online teaching and learning in TVC in Kakamega County?
2. What is the trainees' attitude in the implementation of online teaching and learning in TVC in Kakamega County?
3. How adequate are the online teaching and learning resources to support the teaching and learning in TVC in Kakamega County?
4. What is the level of effectiveness of online teaching and learning in enhancing education in the TVC in Kakamega County?

2. Research Method

2.1 Theoretical Framework

This study adopted the theory of diffusion of innovations. According to (Rogers, 2003), diffusion research centers on the conditions, which increase or decrease the likelihood that members of a given culture will adopt a new idea, product or practice. Rogers asserts that people's attitude toward a new technology is a key element in its diffusion. Since Rogers uses the terms innovation and technology interchangeably, the diffusion of innovations framework seems particularly suited for the study of diffusion of ICT in the TVC curriculum.

Roger's Innovation Diffusion Process theory states that innovation diffusion is a process that occurs over time through five stages: knowledge, persuasion, decision, implementation and confirmation. Accordingly, the innovation-decision process is the process through which an individual or other decision-making units passes from first knowledge of an innovation to forming an attitude toward the innovation, to a decision to reject it, to implementation of the new idea, and to confirmation of this decision (Rogers, 2003).

Diffusion of innovation theory states that media as well as interpersonal contacts provide information and influence opinions and judgment on the use of technology. Studying how innovation occurs, Rogers (2003) argued that it consists of four stages, invention, diffusion or communication through the social systems, time and consequences. The information flows through networks. The nature of networks and the roles opinion leaders play in them determines the likelihood that the innovation will be adopted.

Innovation diffusion research explain variables that influence how and why users adopt a new information medium, such as the Internet. Opinion leaders exert influence on audience behavior via their personal contact, but additional intermediaries called change agents and gatekeepers also influence the process of diffusion (Rogers, 2003). The traditional adoption/diffusion continuum recognize five categories of participants: innovators who tend to be experimentalists and "techies" interested in technology itself, early adopters who may be technically sophisticated and interested in technology for solving professional and academic problems; early majority who are pragmatists and constitute the first part of the mainstream; late majority who are less comfortable with technology, and are the skeptical

second half of the mainstream; laggards who may never adopt technology and may be antagonistic and critical of its use by others. Moore (1991) views these groups as significantly different "markets" in the "selling" of an innovation to faculty adopters.

There are indicators that trainers proceed to adopt ICTs in stages. Myhre (1998) reports that trainers initially focus on their own interaction with the new medium, and as they gradually become comfortable with the technology, they start deliberating upon potential learning benefits that would result from the use of computers. Myhre (1998) concludes that this increased familiarity with computers allows trainers to turn their interest to the pedagogical use of technology rather than its operational issues, but also emphasizes that such change processes do not occur rapidly and are not easily achieved. Ultimately, the power of ICTs will be determined by the ability of trainers to use the new tools for learning to create rich, new, and engaging learning environments for their trainees.

2.2 Research design

The study employed a convergent parallel mixed method design. A mixed method research was introduced in the middle late 1980s (Creswell, 2013). This methodology includes both quantitative and qualitative data within a single study.

2.3 Target Population

According to Gall, Borg & Gall (1996), Target population is a set of people, events and objects to which a researcher wishes to generalize the results of the study. Population is a well-defined set of people, services, elements and groups of things or households that are being investigated(Ngechu (2004). The research targeted, 1 County Director of Education, 4 Principals of the Technical and Vocational Colleges, 230 trainers and 6610 trainees from the Technical and Vocational Colleges in Kakamega County.

2.4 Description of the Sample and Sampling Procedures

Quota sampling was applied to determine the Technical and Vocational Colleges from which the study was conducted which included: Shamebere, Butere, Bushianga and Mumias West within Kakamega County. Also, Simple random sampling was employed after a proportionate distribution of respondents in the 4 Technical and Vocational Colleges. Furthermore, Purposive sampling was used for TVC Principals and County Director of Education.

The sample size of the trainers and the trainees was determined using Slovin's formula (Adam, 2020), which is random sampling technique formula to calculate sample size, where;

$$\mathbf{n} = \frac{\mathbf{N}}{\mathbf{1} + \mathbf{N(e)^2}}$$

Where, n is sample size, N is study population, and e is coefficient (0.05).

In this study the target population is 6845, therefore the sample size was calculated as shown below.

$$\boldsymbol{n} = \frac{\mathbf{6845}}{\mathbf{1} + \mathbf{6845(0.05)^2}} = \mathbf{378}$$

According to the calculation, the sample size w**as** 378 respondents.

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Table 1: Sample size distribution.

	Shamberere	Butere	Bushiangala	Mumias West	Total
Principals	1	1	1	1	4
County Director of Education	-	-	-	-	1
Trainers	4	3	3	2	12
Trainees	131	66	98	66	361
Total	136	70	102	69	378

2.5 Description of Research Instruments

The researcher used questionnaires, interviews, document analysis to collect primary data required to answer the research questions. Questionnaires was used to collect data from trainers and trainees. County directors of education and principals of the institutions were subjected to interview schedule.

2.6 Description of Data Analysis Procedures

The quantitative data collected from the questionnaire was analyzed through descriptive statistics and inferential statistics. Descriptive statistics involved frequencies, percentages, mean and standard deviation. Descriptive statistics was used because it provides a description of the phenomenon of the study. Inferential statistics involved Pearson correlation analysis. Correlation analysis was used to test the nature of the relationship that existed between the independent variable and dependent variable (Mugenda & Mugenda, 2008). The data collected using interview guides were qualitative in nature. They were analyzed using conceptual content analysis which was the best suited method of analysis.

3. Results and Analysis

3.1. Trainer's attitude in the implementation of online teaching and learning in TVC in Kakamega County.

The first objective of the study was to determine trainers' attitude in the implementation of online teaching and learning in TVC in Kakamega County. Table 2 shows the descriptive results.

Table 2: Trainers' attitude in the implementation of online teaching and learning

Statement	Mean	Std. Deviation
Online learning is very economical for education institutions to adopt	4.09	1.136
I believe using online teaching and learning will improve the quality of work.	4.36	.505
Computers make work more interesting	4.36	.505
I prefer reading articles in online learning	4.55	.522
I prefer using a computer to prepare my lessons.	4.73	.467
I feel uncomfortable reading a textbook on a computer screen than a physical textbook.	4.45	.522
I enjoy instructing using electronic devices.	4.00	.894
It is easier to revise electronic education materials than printed materials.	4.36	.505
Delivering a lecture through online means is difficult	4.82	.405
A face-to face method is more learner centered than online learning method	4.55	.522
Teaching through online is tiresome	4.82	.405
Online learning increases learner isolation	3.64	.674
Overall Mean Score	4.39	0.589

Source: Field Data (2023)

The study findings in Table 2 shows that trainers (M=4.36; SD=.505) agree that it is easier to revise electronic education materials than printed materials. Moreover, the study findings shows that trainers (M=4.09; SD=1.136) agree that online learning is very economical for education institutions to adopt. Also, the findings reveal that trainer (M=4.36; SD=.505) agree that using online teaching and learning will improve the quality of work. In addition, the trainers (M=4.36; SD=.505) agree that computer make work more interesting.

Also, the findings of the study shows that trainers enjoy instructing using electronic devices (M=4.00; SD=.894). Moreover, the findings reveal that trainers agree that they feel uncomfortable reading a textbook on a computer screen than a physical textbook (M=4.45; SD=.522). In addition, the results show that trainers (M=4.55; SD=.522) agree that face-to face method is more learner centered than online learning method. Further, the results show that trainers (M=3.64; SD=.674) agree that online learning increases learner isolation. On the hand, the findings reveal that trainers strongly agree (M=4.82; SD=.405) that delivering a lecture through online means is difficult. Further, the findings shows that trainers (M=4.55; SD=.522) agree that they prefer reading articles in online learning.

3.2.Trainees Attitude on Online teaching and Learning

The second objective of the study was to determine the trainees' attitude in the implementation of online teaching and learning in TVC in Kakamega County.

Table 3: Trainees attitude in the implementation of online teaching and learning

Statement	Mean	Std. Deviation
Online learning is very economical for education institutions to adopt	3.51	1.203
I believe using online teaching and learning will improve the quality of work.	3.90	1.075
Computers make work more interesting	4.30	.869
I prefer reading articles in online learning	3.66	1.098
I prefer using a computer to prepare my lessons.	3.57	1.247
I feel uncomfortable reading a textbook on a computer screen than a physical textbook.	2.89	1.311
I enjoy instructing using electronic devices.	4.01	3.856
It is easier to revise electronic education materials than printed materials.	3.47	1.309
Delivering a lecture through online means is difficult	2.81	1.371
A face-to face method is more learner centered than online learning method	4.08	1.109
Teaching through online is tiresome	2.69	1.418
Online learning increases learner isolation	3.71	1.280
Overall Mean Score	3.55	1.429

Source: Field Data (2023)

The study findings in Table 3 shows that trainees are neutral (M=3.47; SD=1.309) that it is easier to revise electronic education materials than printed materials while the. Moreover, the study findings shows that trainees (M=3.51; SD=1.203) agree that online learning is very economical for education institutions to adopt. Also, the findings reveal that trainee (M=3.90; SD=1.075) agree that using online teaching and learning will improve the quality of work. In addition, the trainees (M=4.30; SD=.869) agree that computer make work more interesting.

Also, the findings of the study shows that trainees enjoy instructing using electronic devices (M=4.01; SD=3.856). Moreover, the findings reveal that trainees are neutral (M=2.89; SD=1.311) that they feel uncomfortable reading a textbook on a computer screen than a physical textbook. In addition, the results show that trainees (M=4.08; SD=1.109) agree that face-to face method is more learner centered than online learning method. Further, the results show that trainees (M=3.71; SD=1.280) agree that online learning increases

learner isolation. On the hand, the findings reveal that trainees are neutral (M=2.81; SD=1.371) that delivering a lecture through online means is difficult. Further, the findings shows that trainees (M=3.66; SD=1.098) agree that they prefer reading articles in online learning.

3.3 Adequacy of online teaching and learning resources

The third objective of the study was to find out the adequacy of the online teaching and learning resources to support the teaching and learning in TVC in Kakamega County. The descriptive statistics is shown in Table 4 and 5

Table 4: Trainers' perception on adequacy of online teaching and learning resources

Statement	Mean	Std. Deviation
Desk top Computers for teachers & trainer use	2.27	1.191
Interactive white boards	2.82	1.250
Overhead projectors	2.00	1.414
Internet connection	2.91	1.300
Laptops for teachers	2.91	.539
Source of electric power	3.18	1.401
Tablets for trainees	2.82	.405
VCD/DVD Player	2.91	.831
Video decoder/player	2.55	.522
Copy scanner	1.91	1.044
Photocopy Machine	2.82	1.537
Television	3.18	1.250
Radio	1.91	1.044
Digital Camera	3.00	1.095
Wi-Fi	3.36	1.286
Fax machine	2.91	.302
Overall Mean Score	2.72	1.026

Source: Field Data (2023)

Table 5: Trainees' perception on adequacy of online teaching and learning resources

Statement	Mean	Std. Deviation
Desk top Computers for teachers & trainer use	2.59	1.129
Interactive white boards	3.18	1.281
Overhead projectors	2.29	1.219
Internet connection	3.08	1.313
Laptops for teachers	2.56	1.469
Source of electric power	3.88	1.321
Tablets for trainees	1.96	1.443
VCD/DVD Player	2.06	1.335
Video decoder/player	1.91	1.184
Copy scanner	2.47	1.284
Photocopy Machine	3.16	1.344
Television	2.69	1.387
Radio	1.96	1.391
Digital Camera	2.39	1.516
Wi-Fi	3.52	1.345
Fax machine	2.21	1.407
Overall Mean Score	2.62	1.336

Source: Field Data (2023)

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The findings in Table 4 shows that the trainers were neutral that the online teaching and learning resources are adequate (M=2.72; SD=1.026). In addition, the findings shows that trainers disagreed that desktop computers for trainers and trainees use is adequate (M=2.27; SD=1.191) and overhead projectors are inadequate (M=2.00; SD=1.250). Also, the findings shows that trainers disagreed that copy scanner is adequate (M=1.91; SD=1.044) and that tablets for trainees is adequate (M=1.96; SD=1.443). Moreover, the trainers were neutral that internet connections were adequate (M=2.91; SD=1.300) and that photocopy machines (M=2.82; SD=1.537) and source of electric power (M=3.18; SD=1.401) was adequate.

Table 5 shows the findings about the trainees' views on the adequacy of online teaching and learning materials. The study findings showed that trainees were neutral that the online teaching and learning resources are adequate (M=2.62; SD= 1.336); and desktop computers for trainers and trainees use is adequate (M=2.59; SD=1.129). Moreover, the trainees were neutral that internet connections were adequate (M=3.08; SD=1.313) and that photocopy machines and source of electric power was adequate (M=3.16; SD=1.344). Further, trainees disagreed that overhead projectors are inadequate (M=2.29; SD=1.219); copy scanner is adequate (M=2.47; SD=1.284) and tablets for trainees is adequate (M=1.96; SD=1.443). Other online teaching and learning resources such as radio, VCD/DVD player were indicated by the trainees that was inadequate.

3.4 Level of effectiveness of online teaching and learning

The fourth objective of the study was to establish the level of effectiveness of online teaching and learning in enhancing education in TVC in Kakamega County. The descriptive statistics are shown in Table 6 and 7

Table 6: Trainers view on level of effectiveness of online teaching and learning

Statement	Mean	Std. Deviation
The usability and expertise in computer ensure the effectiveness in computer mediated learning	3.27	1.348
Online learning ensures the effectiveness in terms of coping up with missed lectures	3.64	1.206
Productivity of students can be enhanced through online learning to strengthen educational concepts.	3.00	1.414
Online learning is economic in terms of time for trainees and trainers.	3.64	1.027
Trainees and trainers' interaction is weak through online learning	3.45	1.635
Online learning ensures the effectiveness for presenting the work in class.	2.91	1.044
Quality of teaching and learning can be increased through Online learning because it integrates various types of media.	3.18	1.471
Online learning offers maximum engagement of students.	2.82	.603
A number of problems were created by online learning rather than its solution.	2.91	1.300
Access to education increases through online learning.	3.55	1.036
Maximum amount of time is consumed while learning through online learning.	3.27	1.104
Overall Mean Score	3.24	1.199

Source: Field Data (2023)

Table 7: Trainees view on level of effectiveness of online teaching and learning

Statement	Mean	Std. Deviation
The usability and expertise in computer ensure the effectiveness in computer mediated learning	3.58	1.096
Online learning ensures the effectiveness in terms of coping up with missed lectures	3.79	1.150
Productivity of students can be enhanced through online learning to strengthen educational concepts.	3.80	1.103
Online learning is economic in terms of time for trainees and trainers.	3.82	1.180
Trainees and trainers' interaction is weak through online learning	3.49	1.458
Online learning ensures the effectiveness for presenting the work in class.	3.35	1.245
Quality of teaching and learning can be increased through Online learning because it integrates various types of media.	3.65	1.191
Online learning offers maximum engagement of students.	2.89	1.384
A number of problems were created by online learning rather than its solution.	3.01	1.282
Access to education increases through online learning.	3.77	1.157
Maximum amount of time is consumed while learning through online learning.	3.21	1.416
Overall Mean Score	3.49	1.242

Source: Field Data (2023)

The findings in Table 6 shows that trainers were neutral that the usability and expertise in computer ensure the effectiveness in computer mediated learning (M=3.27; SD=1.348); that productivity of students can be enhanced through online learning to strengthen educational concepts (M=3.00; SD=1.414); and that student and teachers' interaction is weak through online learning (M=3.45; SD=1.635). Also, the trainers are neutral that quality of teaching and learning can be increased through online learning because it integrates various types of media (M=3.18; SD=1.471); that online learning ensures the effectiveness for presenting the work in class (M=2.91; SD=1.044). Further, the findings reveal trainers were neutral that a number of problems were created by online learning rather than its solution (M=2.91; SD=1.300); maximum amount of time is consumed while learning through online learning (M=3.27; SD=1.104) and that online learning offers maximum engagement of students (M=2.82; SD=.603). Further, the results showed that trainers agreed that online learning ensures the effectiveness in terms of coping up with missed lectures (M=3.64; SD=1.206) and access to education increases through online learning (M=3.55; SD=1.036). The overall mean results shows that trainers (M=3.24; SD=1.199) were neutral on the level of effectiveness of online teaching and learning.

On the side of the trainees' views on the level of effectiveness of online teaching and learning, Table 7 showed that trainees agreed that the usability and expertise in computer ensure the effectiveness in computer mediated (M=3.58; SD=1.096) and that online learning ensures the effectiveness in terms of coping up with missed lectures (M=3.64; SD=1.206). Moreover, the findings revealed that trainees agreed that productivity of students can be

enhanced through online learning to strengthen educational concepts (M=3.80; SD=1.103). Also, the trainees (M=3.65; SD=1.191) agreed that quality of teaching and learning can be increased through online learning because it integrates various types of media and access to education increases through online learning (M=3.77; SD=1.157). On the other hand, the findings showed that trainees are neutral that students and teachers' interaction is weak through online learning (M=3.49; SD=1.458) and that online learning ensures the effectiveness for presenting the work in class (M=3.35; SD=1.245). Further, the findings revealed that trainees were neutral that a number of problems were created by online learning rather than its solution (M=3.01; SD=1.282); maximum amount of time is consumed while learning through online learning (M=3.21; SD=1.416) and access to education increases through online learning and online learning offers maximum engagement of students (M=2.89; SD=1.384). The overall mean results shows that trainees (M=3.49; SD=1.242) were neutral on the level of effectiveness of online teaching and learning.

3.5Quality of online Education

The study sought from the respondents on the quality of online education.

Table 8: Trainers view on quality of online education

Statement	Mean	Std. Deviation
Online learning is more effective	3.91	.539
Online learning is more efficient	3.64	.674
Online learning is more flexible	3.91	.539
Online learning is less costly	3.82	.751
Online learning is convenient	3.82	.603
Online learning increased completion rate	3.00	1.414
Overall Mean Results	3.68	0.753

Source: Field Data (2023)

Table 9: Trainees view on quality of online education

Statement	Mean	Std. Deviation
Online learning is more effective	3.29	1.354
Online learning is more efficient	3.20	1.334
Online learning is more flexible	3.48	1.289
Online learning is less costly	2.77	1.424
Online learning is convenient	3.45	1.234
Online learning increased completion rate	3.49	1.902
Overall Mean Results	3.28	1.423

Source: Field Data (2023)

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The finding of the study in Table 8 shows that trainers agreed that online learning is more effective (M=3.912; SD=.539); and online learning is more efficient (M=3.64; SD=.674). Further, the findings showed that trainers agreed that online learning is more flexible (M=3.91; SD=.539); online learning is less costly (M=3.82: SD=.751) and online learning is convenient (M=3.82; SD=.603). Finally, the results showed that trainers were neutral that online learning increased completion rate (M=3.00; SD=1.414). The overall mean results showed that trainers agreed that there was quality of online education (M=3.68; SD=.753)

The study also gathered information from the trainees on quality of online education. Table 9 revealed that trainees were neutral that that online learning is more effective (M=3.29; SD-=1.354); online learning is more efficient (M=3.20; SD=1.334) and were neutral that online learning is more flexible (M=3.48; SD=1.289). Moreover, the results revealed that trainees were neutral that online learning is less costly (M=2.77; SD=1.424); online learning is convenient (M=3.45; SD=1.902); and that online learning increased completion rate (M=3.49; SD=1.902). The overall mean results showed that trainees (M=3.28; SD=1.423) were neutral on the quality of online education.

3.6Correlation results

The correlation of factors affecting the implementation of online teaching and learning in enhancing education in technical and vocational colleges in Kakamega County was tested using Pearson's coefficient of correlation (r) and probability value (p-value) analysis. Tables10 and 11 display the correlation results.

Table 10: Correlation Analysis on Trainers view about implementation of online education in TVC Kakamega County

		Attitude	Adequacy	Effectiveness	Quality
Attitude	Pearson Correlation	1	.550	.219	.760**
	Sig. (2-tailed)		.080	.518	.007
	N	11	11	11	11
Adequacy	Pearson Correlation	.550	1	.599	.660*
	Sig. (2-tailed)	.080		.052	.027
	N	11	11	11	11
Effectiveness	Pearson Correlation	.219	.599	1	.709*
	Sig. (2-tailed)	.518	.052		.015
	N	11	11	11	11
Quality	Pearson Correlation	.760**	.660*	.709*	1
	Sig. (2-tailed)	.007	.027	.015	
	N	11	11	11	11

**. Correlation issignificantatthe0.01level(2-tailed).

Source: Field Data (2023)

Table 11: Correlation analysis on Trainees view about implementation of online education in TVC Kakamega County

		Attitude	Adequacy	Effectiveness	Quality
Attitude	Pearson Correlation	1	-.078	.295**	.161**
	Sig. (2-tailed)		.150	.000	.003
	N	340	340	340	340
Adequacy	Pearson Correlation	-.078	1	.221**	.320**
	Sig. (2-tailed)	.150		.000	.000
	N	340	340	340	340
Effectiveness	Pearson Correlation	.295**	.221**	1	.501**
	Sig. (2-tailed)	.000	.000		.000
	N	340	340	340	340
Quality	Pearson Correlation	.161**	.320**	.501**	1
	Sig. (2-tailed)	.003	.000	.000	
	N	340	340	340	340

**. Correlation issignificantatthe0.01level(2-tailed).

Source: Field Data (2023)

From Table 10 the results shows that trainers cited a strong significant positive relationship (r=0.60, p=0.007) between the attitude of trainers on the quality of online teaching and learning in enhancing education in technical and vocational colleges in Kakamega County at 0.01 level in a two tailed test while the trainees cited low significant relationship. Further, Table 10 revealed that trainers indicated the existence of a strong significant positive relationship (r=0.709, p=0.015) between the level of effectiveness of online teaching and learning and quality online education at 0.01 level in a two tailed test. In Conclusion, Correlational analysis revealed that trainers (r=0.660, p=0.027) indicated moderate significant relationship between the adequacy of online teaching and learning resources and quality of online education at 0.01 level in a two tailed test.

The trainees cited a moderate positive relationship between adequacy of online teaching and learning resources and quality of online education (r=0.660, p=0.027) while trainees stated low positive relationship (r=.320, p=0.000) at 0.01 level in a two tailed test. In addition, Table 11 revealed that trainees (r=0.501, p=0.000) indicated moderate significant relationship between the level of effectiveness of online teaching and learning and quality online education at 0.01 level in a two tailed test. Finally, Correlational analysis revealed that trainees (r=0.320, p=0.000) indicated low significant relationship between the adequacy of online teaching and learning resources and quality of online education at 0.01 level in a two tailed test.

3.6 Thematic Analysis

The findings from the interview schedules shows that teachers have positive attitude and developed some content for gradual implementation of the online education in our institutions. The institutions are prepared towards the eLearning implementations. The following statement were noted:

> "…our teachers are positive and have developed some contents for gradual implementation."
> [Interviewees 1, 2 and 3]

Also,

> "…our institution has established LMS, capacity-built staffs and internet connections available. However, there is limited infrastructure"
> [Interviewee 2]

The interview session with the County Director of Education, revealed that most of the TVC's in Kakamega County have inadequate facilities to enhance online education. The following statement was recorded:

> "…Most of the government TVC's in Kakamega are lacking the basic infrastructures for teaching and learning materials that makes online education difficult to implement"
> [Interviewee 1]

From the interview schedules with the principals, it was noted that computers are available in the TVC's. However, the computers are not adequate to facilitate effective online teaching and learning. The following statements were jotted:

> "…there are computers and other gadgets in our technical institution for e-learning process but the computers are not enough. Thus, results to ineffective delivery of the online education in our institutions."
> [Interviewee 3 and 4]

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> "…there are computers and other gadgets in our technical institution for e-learning process but the computers are not enough. Thus, results to ineffective delivery of the online education in our institutions."
> [Interviewee 3 and 4]

The finding from the interview schedule with the County Director of Education revealed that the use of online teaching and learning method within the technical institutions in Kakamega County has not been effectively implemented. This is due to inadequate teaching and learning resources. The County director of Education was quoted stating:

> "…the use of online teaching and learning method within the technical institutions in Kakamega County has not been effectively implemented because they lack necessary teaching and learning resources such as the internet connection, lack of computers and other ICT gadgets such as copy scanners, wifi modem, and fax machines among others"
> [Interviewee 1]

In addition, the interview findings with the principals revealed that the principals are versed with the e-learning and there is committee implementing it in the country. The trainers are 50-50. The following were the statements noted:

> "… the trainers who are versed with the e-learning mode of learning are available. However, they cannot fully implement effectively on the online teaching and learning method because of inadequate online resources."
> [Interviewee 2]

Also,

> "… online education has increased access to education especially for those who cannot have time to attend the physical classes."

[Interviewee 4]

The finding from the interview schedule with the County Director of Education established that adoption of online teaching and learning method within the technical institutions in Kakamega County will enhance learning process for the trainees. The County director of Education was quoted saying:

> "…there is value addition in the learning process through the embracing of online teaching and learning. This is because it is flexible, convenient and cheaper compared to the physical learning method."
> [Interviewee 1]

4. Conclusion

The study concluded that green purchasing had a statistical effect on the performance of industrial enterprises Based on the findings above, the study concluded that: Attitude of the trainers and trainees had effect on the quality of online education; Adequacy of learning and teaching resources had effect on the quality of online education and the level of effectiveness of online teaching and learning had influence on the quality of online education.

5. Recommendations of the study

The study recommends the following:There is need for the management of the TVC in Kakemega County to have a changed perception on the online education. This will assist in the adoption and implementation of online education in the various TVC in the county; The management of the TVC's in Kakamega County should ensure that the online teaching and learning materials such as tablets, desktop computer, copy scanners, overhead projectors, and internet connections among others are available to enhance the online education; and the management of the TVC's in Kakamega County should ensure that the available resources are utilized correctly and this can assist in achieving its goal on the online education. This will also improve on the quality of online education in the TVC's within the county.

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