



TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING TEACHERS' COMPETENCY NEEDS ON LEARNING MANAGEMENT SYSTEM FOR EFFECTIVE TEACHING AND LEARNING IN TECHNICAL COLLEGES IN EDO STATE

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Abstract

The rapid increase of Learning Management System Technology (LMST) has placed new demands on technical and vocational education and training (TVET) teachers' competencies needed to fully and efficiently participate and progress in the new information and communication technology (ICT) society. This challenge posed by LMST is of great importance to TVET programme and TVET teachers. Technical education aims at training and developing manpower in quantity and quality to meet the societal needs and contributes to sustainable national development. The question then is, what competencies must they acquire to face these challenges squarely? This study, therefore, aimed to determine LMST competencies needed by TVET teachers in Edo state. The study adopted a survey research design and was guided by two research questions and two null hypotheses. A structured questionnaire was used for data collection. The reliability coefficient of the instrument was 0.71, using Cronbach's alpha coefficient reliability method; while three experts did the face and content validation. Percentage and mean were used to answer the research questions. Null hypotheses 1 and 2 were tested with Analysis of Variance and Z-test. It was found that TVET teachers need teaching professional LMST competencies and computer operational competencies. It was recommended, among others, that TVET curriculum be reviewed to incorporate the relevant LMST competencies that will meet the TVET teachers' needs and interest.

Keywords: *Competency Needs, Learning Management System Technology, Teaching and Learning, TVET Teachers.*

INTRODUCTION

The major aim of education is to equip recipients with knowledge and skills needed to function effectively this contribute to the development of the society. Federal Republic of Nigeria (2014) in her education policy document stated that the goal is on the development of mental, physical and social abilities and competencies and acquisition of appropriate skills as equipment for the individual to contribute to the development of the nation. These goals can be easily achieved through a well design vocational and technical education programme. The technical education programme involves acquisition of skills, knowledge and the application of knowledge and technological skills acquired.

The rapid development of learning management system technology has landed the world into a new era variously known as the era of globalization, information society, and knowledge economy and network society. The continuous development of learning management system technology (LMST) has created new opportunities within the domain of education. LMST is one of the vital tools in educational technology in enhancing the quality of learning and teaching (Lin, 2017; Kent, Laslo & Rafaeli, 2016). There has been an increase in the uptake of LMST throughout the world in order to create a novel learning strategy and enhance a collaborative and effective learning environment for both students and instructors (Kim & Park, 2017). LMST are web-based



applications used in administering courses. They provide the ability to track students' progress and can also serve as content management systems that facilitate access to resources required for courses. Since an LMST is web-based, access to course resources is available for any internet-ready device from anywhere and at any time. Developing countries are not being left behind as countries such as Indonesia (Kim & Park, 2017), Egypt (Abdel-Wahab, 2008), Jordan (Abbad, Morris & De Nahlik, 2009) and Tanzania (Munguatosha, Muyinda & Lubega, 2011) have invested significant resources in implementing LMST. The reason for this uptake could be as a result of the benefits of LMST which include enhancing the teaching and learning process (Salloum *et al.*, 2018), providing access to the educational curricula, expanding educational opportunities and reducing the long-term costs of learning (Lwoga, 2014). Other studies have shown that LMST motivate students' interaction with other students and their instructors, and ease communication (Arkorful & Abaidoo, 2015). Additionally, LMST are an effective method of instruction that increases knowledge (Salter, Karia, Sanfilippo & Clifford, 2014). In Nigeria, the National Policy on ICT recognizes the importance of LMST in the education sector (NITDA, 2016). Many stakeholders in the Nigeria higher education sector have started to appreciate the effectiveness of integrating technology in teaching and learning (Yakubu, Kah & Dasuki, 2019). However, just like many developing countries, the uptake of the use of technology learning system has been very slow with few universities having incorporated the use of technology, specifically LMST, for teaching and learning (Yakubu *et al.*, 2019). Also, the few institutions that have adopted the use of LMST have opted for proprietary software; this is especially true for public (government owned) universities. These proprietary systems are designed without taking into consideration, either the pedagogical aspects of e-Learning or the student requirements for their learning needs (Eberendu, 2015). This results in the presence of anomalies and a system void of the expected benefits of LMS (Adebayo & Abdulhamid, 2014). Furthermore, prior research has shown that the implementation and use of LMST in institutions of higher education in developing countries have continued to fail (Eberendu, 2015). Salloum *et al.*, (2018) argued that many students do not persist with learning how to use LMST after the initial experience with using the system. Thus, there is a need to understand the factors that contribute to the students' acceptance of LMS in developing countries after deployment. While there is little existing research investigating this phenomenon in Nigerian universities (Adewole-Odeshi, 2014; Ayodele *et al.*, 2016; Ogunbase, 2014; Olatunbosun *et al.*, 2015), none of these studies has taken into account certain significant and influential factors in the context of e-Learning, such as instructor quality, learning value and course quality. Research has shown that these factors contribute to the student's acceptance of e-Learning systems (Cheng, 2012; Lwoga, 2014; Ain *et al.*, 2016).

Selvi (2010) defined competencies as the knowledge, skills, attitudes, values, motivations and beliefs people need in order to be successful in a job. Adodo (2014) viewed competency in teaching as the ability of the teacher to exhibit on the job skills and knowledge gained as a result of training. Several areas of teachers competency have been identified in educational literature. These include instructional competencies, professionalism competencies (Roberts, Dooley, Harlin & Murphy, 2006), field competencies, curriculum competencies, emotional competencies and information and communication technology competencies (Selvi, 2010). Others are pedagogical skills and affective work skills (Atsumbe, Raymond & Mele, 2012; Akpan & Silas, 2013), intra and interpersonal competencies (the European Higher Field of Education, 2011), students mentoring competencies (Ekong, 2013b) and laboratory management competencies (Ogwo & Oranu, 2006; Onweh, 2013). This study is centred on eight broad areas of teachers' competency needs namely pedagogical competency, information and communication technology (ICT) competency, laboratory management competency, affective work competency, intra-personal competency, interpersonal



competency, classroom management competency and instructional materials development and utilization competency.

Basically, gender is an important variable to consider in this study. According to Abdul-Raheem (2010), gender involves the roles, attitudes, behavior and values ascribed by the society to males and female. It is enforced, through culture practices. Hence, the type of training and exposures given to male and female individuals in a given society depend on the people's understanding and belief. Gender, therefore is a very important variable because a person's personal orientation and outlook play a crucial role in performance. Academically, both male and female teachers are involved in the teaching of technical courses in technical colleges in Edo State but the female technical teachers are very few in numbers in relation to the male counterparts.

Various scholars such as Igbinedion and Ojeaga (2012); Amoor (n.d); Ediagbanya, Agbaje and Suberu (2012); Edokpolor and Abusomwan (2017) Edokpolor and Chukwuedo (2018); Edokpolor (2019) and Okoye and Edokpolor (2021) have identified some major factors responsible for low participation of female in TVET programme especially in universities in Nigeria to include among others, low societal estimation of TVET as education for the lowest class of people, education for the last resort, for people of low intelligent quotient, low achievers and low status occupation. Erinsho (1997), Ndahi (1987) in Edu and Edu (2012), separately observed that in the past, neither traditional nor western education encouraged or provided equal opportunities for women to enter the field of vocational and technical education. According to Ndahi (2002), during the early period of the development of technical education in Nigeria, a technician was considered a male who could repair mechanical or electronic devices or products (turn screws, nuts, and bolts). It was not conceivable at that time to think of a female as a technician, therefore, participation in these technical institution was strictly boys for industrial technical education courses and girls for the vocational home economics.

Furthermore, factors affecting female participation in TVET programmes include: relegation of women to the home; parental perceptions of cost/benefits of educating girls (this affects low income families particularly); patriarchy (female seclusion practices and early marriage); discriminatory labour market practices; masculine image of TVET projected in textbooks, media and popular assumptions; poor facilities, including teacher-supply, teacher quality and equipment; nature of TVET occupations which is not easily combined with child-rearing and child-care; lack of female role models; gender bias TVET curriculum; peer pressure; early marriage; demand for female to care for siblings, homes and farms (Ayonmike, 2010). In order to boost the participation of female technical teachers in technical colleges, it behooves Edo State government to urgently come out with a workable and result oriented sensitization programme.

Moreover, Adodo (2014) reported that most technical teachers in technical colleges lack knowledge of basic principles and skills in learning management system technology in producing simple classroom tests for evaluating students' learning outcome. In addition, Umunadi (2009) reported that most TVET teachers appear to lack adequate competent skills in developing and utilizing contemporary instructional materials, especially ICT equipment in instructional delivery.

Changes spurred by LMST should be of great importance to technical education program in supporting workforce development. The vision of technical education is to train and develop manpower in quantity and quality to meet societal needs and to contribute to national development. It's principles and philosophies are such that every of its graduate would live and contribute effectively to the socioeconomic development of the individual's State. In order to ensure that technical education remains valuable to the educational system, its programs must continue to be enriched to prepare students for the workforce and society. The value and relevance of technical education in the development of skilled manpower necessary for sustainable economic development



must be recognized and appreciated. It could be suggested that skilled technicians and technologists are critical in meeting the challenges of a technology-driven economy, running in tandem with the rest of the world's economies. Thus in this era of LMST, Technical colleges must train students that are knowledgeable with highly tuned thinking skills; Able to use technology and new resources optimally; Able to combine creativity and innovation effectively; and Having a diversity of skills and knowledge in the use of technology.

Consequently, there is an increasing global emphasis on integrating LMS into education. The evolution and infusion of LMST into the curriculum call for changes in the teaching profession. Upon this background, this study investigated LMST skills required by technical college teachers in order to meet the challenges of education in this technological society.

Statement of the Problem

Presently, Nigerian educational system has been full with problems which range from the quality and quantity of instructional materials to the quality and quantity of academic staff. LMST is causing a revolution and if any education sector does not join, it will not only be old-fashioned, but, in a few years, it will be out of competition in the educational market (Arkorful & Abaidoo, 2015). New technologies require new teacher roles, new pedagogues, and new approaches to teacher training. The successful integration of LMST into the technical education classroom will depend on the ability of technical college teachers to structure the learning environment in non-traditional ways; Merge new technology with new pedagogy; Develop socially active classrooms; and encourage cooperative interaction, collaborative learning, and group work.

Thus the key skills of the future according to UNESCO (2018) will include the ability to develop innovative ways of using technology to enhance the learning environment, and to encourage technological literacy, knowledge deepening and knowledge creation. The concern is not necessarily on making policies or flooding the schools with a range of technological hardware and software. Rather, the concern relies more on (1) how aware the technical college teachers are of the challenges posed by LMST? and (2) what new knowledge and skills technical college teachers must imbibe in order to face these challenges squarely?

Thus the problem of this study is centered on searching for LMST competencies required by technical college teachers, so that they will be in the best position to effectively use the technological hardware and software that are available in the schools.

Purpose of the Study

The purpose of the study was to determine the extent to which certain LMST competencies are required by technical college teachers (TCT) in Edo state Nigeria. Specifically, the study set out to determine:

1. the extent to which LMST skills such as computer operational competencies are required by TCT in Edo State.
2. the extent to which LMST skills such as internet/networking competencies are required by TCT in Edo State.

Research Questions

The following research questions guided the study.

1. To what extent does computer operational competencies are required by TCT in technical colleges in Edo State?
2. To what extent does computer operational competencies are required by male and female TCT in Edo State?

Research Hypotheses

The following null hypothesis was tested at a 0.05 level of significance.

Ho₁. There is no significant difference in the mean ratings of TCT in all the technical colleges on computer operational competencies required by TCT in Edo State.

Ho₂. There is no significant difference in the mean ratings of male and female TCT on computer operational competencies required by TCT in Edo State.

Method

Research Design

A survey research design was adopted for this study. This research design is considered appropriate since the study set out to determine the LMST competencies needed by technical college teachers in Edo State. The study aimed at achieving this by gathering the opinions of TCT on the subject matter using a structured questionnaire as the instrument.

Population and Sample

The population of the study comprised of sixty (60) technical teachers in technical colleges in Edo States. Specifically, the TCT are those involved in teaching in technical related areas such as electricity and electronics, mechanics and automobile, metal and welding, wood, building, drafting and design, industrial maintenance, industrial safety and environmental technologies. There were 14 technical teachers in FSTC Uromi, 18 technical teachers in GSTC, 10 technical teachers in GSTC Irrua, 9 technical teachers in GSTC Igarra, 9 technical teachers in GSTC Afuze as the time this research was conducted. All these TCT totaling 60, which formed the population of the study. There was no sampling as the entire population was used for the study due to the fact that the size was not too large. Total population sampling was used.

Table 1. Population Distribution of TCT in Edo State Nigeria

Technical Colleges	Male	Female	Population
FSTC UROMI	12	2	14
GSTC BENIN	15	3	18
GSTC IRRUA	9	1	10
GSTC IGARRA	8	1	9
GSTC AFUZE	8	1	9
Total	52	8	60

Source: MOE (2023).

Data Collection Instrument

The instrument for this survey was a structured questionnaire developed by the researcher after extensive review of related literature. The questionnaire had two sections (A & B). Section A elicited response on the biographical data of the teachers while section B elicited response which provided data for answering the research questions. The instrument was rated on a four-point scale – Highly Required, Required, Fairly Required, Not Required. The respondents were expected to indicate the degree of require for each of the items contained in the instrument. The instrument was rated thus Highly Required = 4; Required = 3; Fairly Required = 2; and Not Required = 1

Validation and Reliability of Data Collection Instrument

The instrument was validated by two experts- one from measurement and evaluation department, one from Vocational Education department, Ambrose Alli University, Ekpoma. The validation took the form of face and content validity. Some items were modified or removed owing to the suggestions of the experts. The reliability coefficient of the instrument was established with Cronbach alpha (α) reliability test from a pilot test administered to a sample drawn from three (different types of) tertiary technical institutions outside the area of the study. The reliability coefficient was found to be 0.71 and it was considered fit for the study (see Appendix K). The choice of this method was based on the fact that Cronbach's alpha coefficient can be employed universally with no regards to the nature of the scoring method adopted in the instrument (Onweh, 2004).

Data Collection Procedure

The data was collected by the use of questionnaire designed by the researcher. The researcher with the help of two research assistants, appointed by the researcher, visited the technical colleges and administered the instrument by hand. The researcher and research assistants reached the target groups through the Heads of Department. Although, where possible, the researcher and research assistants approached the members of the target group personally. The researcher and research assistants allowed the technical college teachers a minimum of five working days to respond to the questionnaire. After which answered questionnaires were collected and those yet to answer the questionnaire were given more five working days to complete the questionnaire. There after the researcher and research assistants returned to collect the questionnaires.

Data Analysis

Data were analyzed using mean and percentage in answering the research questions. The real limits of numbers of the response mode were used to categorize the mean rating of responses. Decision was made in favor of any item that had a mean rating of 2.50 and above, while items that scored mean of 2.49 and below were taken as unimportant. Further analysis was carried out using mean to answer the research question while Analysis of Variance for testing null hypotheses 1 while Z-test was used in testing the null hypothesis 2. All the null hypotheses were tested at 0.05 level of significance. Table below illustrates the schedule for the decision rule for the mean ratings.

Table 2: Schedule for Decision Rule for Mean Rating.

Response Mode	Rate	Real Limit
Highly Required	4	3.5- 4.0
Required	3	2.5 – 3.49
Fairly Required	2	1.5 – 2.49
Not Required	1	1.0 – 1.49

Result

Table 3: Mean ratings of TCT from all the technical colleges in Edo State

S/N	Teaching Based LMS Professional Competencies	Highly Needed	Needed	Fairly Needed	Not Needed	Mean	Remark
1.	Access online research and best practices	48	10	2	0	3.76	Required
2.	Use e-class software for students’ assessment by creating classes, posting assignments and entering scores	50	7	2	1	3.80	Required
3.	Electronically create learning materials and distribute materials to multiple PCs in a single action.	45	13	1	1	3.70	Required
4.	Power on/off or log in/off all classroom computers remotely that is, from the teacher’s PC	25	26	4	3	3.15	Required
5.	Create and use layouts such that teacher’s PC represents the physical layout of the classroom	5	5	47	3	2.20	Not Required
6.	Disable data transfer, deleting or editing by students	35	15	8	2	3.38	Required
7.	Electronically monitor students’ progress in meeting objectives and keep track of their performances	15	35	8	2	3.05	Required
8.	Employ digital devices and strategies during instruction (for example, multimedia presentations, electronic whiteboard, video conferencing	45	14	1	0	3.73	Required
9.	Select and evaluate subject specific software	47	10	3	0	3.73	Required
10.	Electronically produce reports, import rosters and export grades	42	15	3	0	3.65	Required

Table 3: Technical college teachers’ Extent of need of teaching based LMS competencies. Table 3 illustrates the extent of need of the teaching based LMS competencies by the TCT, using mean ratings. The table shows that item 1, 2,3,4,6,7,8,9, and 10 are mostly required teaching based LMS competencies with a mean of 3.76, 3.80, 3.70, 3.15, 3.38, 3.05, 3.73, 3.73, 3.73, and 3.65. Except items number 5 which had the mean score of 2.20, all other items scored above the average mean (2.50), indicating acceptance.

Table 4: The mean ratings of male and female TCT on computer operational competency needs in Edo State.

S/N	Computer Operation Competencies	Highly Needed	Needed	Fairly Needed	Not Needed	X= Male	X= Female	Mean	Decision
11.	Effective use of Computer Aided Design such as AutoCAD, ArchiCAD,	35	15	10	0	1.99	1.42	3.41	Required
12.	Start up and shut down computer	33	16	9	2	1.83	1.50	3.33	Required
13.	Effective use of Presentation software e.g. MS PowerPoint	42	9	8	1	3.2	0.33	3.53	Required
14.	Effective use of Word processor e.g. MS word, word perfect	37	13	10	0	2.03	1.50	3.45	Required
15.	Start an application, Create and Save document using save and save as command	45	10	5	0	2.11	1.55	3.66	Required
16.	Effective use of Computer Aided Manufacturing (CAM)	49	10	1	0	2.10	1.70	3.80	Required
17.	Connect and install peripheral devices (printer, scanner, etcetera)	39	11	8	2	2.23	1.22	3.45	Required
18.	Effective use of Desktop Publisher for example, MS publisher, Ventura publisher, Adobe PageMaker	43	16	1	0	2.05	1.65	3.70	Required
19.	Use self-help resources to diagnose and correct common hardware problems	30	25	5	0	1.99	1.42	3.41	Required
20.	Effective use of Spreadsheets for example MS excel, Multiplan, super Calculator.	29	21	8	2	1.76	1.52	3.28	Required
						X=21.29	X=13.81	35.01	

Table 4 depicts the extent of need of computer operation competencies by male and female TCT in order of highest required competencies to least required competencies using mean ratings as the criteria. It could be observed that all the male TCT are highly competent than their female TCT counterpart in computer operation.

Hypothesis Testing

Research Hypothesis 1: There is no significant difference in the mean ratings of TCT from all the technical colleges on teaching professional competencies needs

Table 5: Analysis of Variance Test for Comparing Mean Ratings of TCT from all the technical colleges on LMS competency Needs in Edo State.

Source of Variance	df	Sum of squares	Mean Squares	α	F-critical	F-cal.	Sig.	decision
Between groups	258	10.11	3.37					Ho ₁
Within groups		6698.32	5.46	0.05	3.07	0.062	Not Sig.	Retained
Total	60	6708.43						

Table 5 is the summary of the Analysis of Variance test that tested Ho₁. The analysis shows that there is no significant difference among the mean ratings of all the technical college teachers (TCT) in Edo State. This is because the calculated F-ratio (0.062) is less than the table (critical) F-ratio (3.07), tested at 0.05 level of significance and degree of freedom 2 and 58 for numerator and denominator respectively. As a result, the null hypothesis is retained.

Discussion

This study showed that the competencies required by TCT and Instructors for effective management of instructional resources include: establishing and articulating learning goals in relation to available instructional resources, ability to improvise relevant instructional resources for teaching and learning technical education, ability to operate technological instructional resources for teaching and learning, ability to set up ICT based instructional resources such as projector for teaching and learning, carrying out routine check to ascertain functionality of some instructional resources and ability to carry out maintenance of instructional facilities during technical education instruction in the classroom and laboratory among others. In agreement with the findings of this study, Ogbuanya, Nweke and Ugwoke (2017) also identified 50 skill items of planning, organizing, controlling, coordinating and management of material resources by lecturers for effective teaching and learning. The report of UNESCO (2015) equally showed that ability to improvise relevant instructional resources, carrying out routine check to ascertain functionality of instructional resources, reading and interpreting operational manuals, ability to carry out maintenance of instructional facilities and ability to operate technological instructional resources for teaching and learning are area of skill need of instructors for effective management instructional resources

Table 3 depicts that all computer operational competencies are needed by TCT, with effective use of computer aided design scoring highest mean and 95% need (when Highly Needed and Needed are combined). This is a clear indication that drafting and design skills are core technical skills needed by every TCT. More than half of the competencies in computer operation scored above 3.00 mean. This indicates that TCT need this category of LMST competencies more than the others. This result is not surprising since computer operational skills are pre-requisite to acquiring other LMS competencies. Arkorful & Abaidoo (2015) observed that technical skills were the first step to acquire knowledge about LMS. Gulbahar and Guven (2018) found that the main barrier to technology implementation is insufficiency of teachers' technical knowledge to prepare materials base on technology. The study of Williams et al (1998) revealed that even where teachers have firm ideas of how technology can be applied in the classroom, they were held back by lack of technical skills and knowledge. However, the study of Sadki (2015) identified computer operating



skills as the lowest computer technology educational needs of Malaysia vocational and technical teachers. Possibly, because technical teachers in Malaysia possess these skills already and need more advanced skills in LMS; whereas TCT in Nigeria are yet to get acquainted with the rudiments of LMS (that is, computer operational skills).

Conclusion

With respect of the findings of this study, it is concluded that; TCT need LMST competencies for efficiency in performing their professional tasks. Irrespective of the type of tertiary technical institution, TCT have the same need for ICT competencies. TCT should be interested and eager to develop their LMST competencies.

Recommendations

Base on the findings of the study the following recommendations were made.

1. Technical college teachers' preparatory programs/curriculum should be reviewed with the view of incorporating the relevant LMST competencies that will meet the needs of the TCT as well as the demands of the knowledge economy.
2. LMST should be a compulsory course in all TCT preparatory programs. Technical college teachers should be helped and encouraged through in service educational activities to become competent in and receptive to LMS.
3. LMST facilities should be made available in the technical institutions to increase access to LMS for both teachers and student-teachers.
4. For effective and sustainable development of the TCTs' LMST competencies, the computer operational competencies should be developed first, as these categories of LMST skills are rudimentary and pre-requisite for developing other LMST skills.

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