



Exploring the impact of psychosocial factors on the integration of ICT in teaching electrical/electronic technology education at tertiary level: A case study in North-West Nigeria

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Abstract

This study determined psychosocial variables responsible for lecturers' non-use of information and communication technology (ICT) in teaching electrical/electronic technology education (EETE) in tertiary institutions in Nigeria. Four research questions were used in this Study. Descriptive survey research design was employed in this study. The study was carried out in North-West Nigeria comprising seven States. The population for this study was 87 comprising lecturers from tertiary institutions offering electrical/electronic technology education in the respective states. The instrument for the study was a structured questionnaire. The instrument was face-validated by three experts. To establish the internal consistency reliability of the questionnaire, Cronbach Alpha reliability technique was used and the reliability value of 0.88 was obtained. Data for the study were collected by the researcher with the help of two research assistants. analyzed using mean and standard deviation for answering research questions one two and three while Pearson correlation summary tested question four. It was found out that competence on ICT as well as teaching subject, attitude, motivation, environmental perception, peer group pressure and school administration have major influence on lecturers' adoption of ICT tools in teaching. Also, gender, experience and qualification influence the use of ICT by lecturers in teaching. Based on the findings, the study among others recommended that the State government through its ministry of education should help to identify ways in which asynchronous/synchronous delivery systems can be used for instructional planning, delivery and evaluation as a useful guide for lecturers in tertiary institutions in the studied region.

Keywords: Psychosocial Variables, Attitude, Motivation, Environmental Perception, Peer Group Pressure, And School Administration

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Introduction

Electrical/Electronic Technology Education (EETE) is one of the courses studied in tertiary institutions. Electrical/electronic technology is designed to produce electrical/electronic personnel for power generation, transmission, distribution and utilization (Onifade, 2018). EETE programme is meant to equip individuals with knowledge, skills and attitudes that will make them functional members in the world of work, contributing to nation building and development to meet the needs of the society (Orji, 2021; Orji & Ogbuanya, 2022). To achieve this, electrical technology should be well taught by lecturers using appropriate tools involving software that can make for easy understanding (Zhang and Liu, 2018; Orji 2015; Orji & Ogbuanya 2018). EETE would be more effectively taught using Information and Communication tools as it is the best practices in lesson delivery in general and Electrical/Electronic technology education in particular.

Variety of plans have been developed to effectively integrate ICTs in teaching/learning but teacher trainers still seem not to use ICT fully in teaching. Despite the provision of equipment and facilities of ICT in schools, teaching of electrical/electronic courses suffer setback using these equipment and facilities due to the fact that the teachers found it cumbersome employing the use of the facilities for their lesson delivery (Sanni, Amosa, Nuhu and Babatunde, 2018). These setbacks might be as result of psychological and social variables

debaring lecturers generally, and Electrical/Electronic Technology lecturers in particular from the use of proper and up-to-date ICT teaching tools.

Psychosocial is that which relates to one's psychological development in, and interaction with a social environment. According to Ogbonna (2015), psychosocial influence relates to psychological and social factors that affect or mar an individual in teaching or studying a particular course. Omoniyi and Oloruntegbe (2012) stated that psychosocial concepts reflect the dynamic relationship between psychological and social issues. Therefore, Psychosocial relates to the psychological factors which are attitude, motivation, knowledge, competence, behaviour among others, and social attributes such as environment, peer, administration, community, school among others. Based on this, Pearson (2013) and Imasuen (2013) observed that lecturer's professional training and development which they receive may also influence their use of modern tools in teaching. This means knowledge and understanding of the tools are of great importance. Against these backgrounds, in order to make teaching of Electrical/Electronic technology particularly more effective to students in this digital age, it is important to investigate psychosocial variables that influence lecturers and debar the use of digital technologies in teaching EETE effectively in tertiary institutions.

Purpose of the study:

The general purpose of this study is to investigate the psychosocial variables influencing lecturers' use of ICT in teaching Electrical/Electronic Technology Education in tertiary institution in North-West Nigeria. Specifically, the study answered the following research questions:

1. does competence in ICT have influence on lecturers of EETE on their use of ICT tools in teaching?
2. does attitude of Electrical/Electronic Technology Education lecturers have influence on their use of ICT tools in teaching?
3. does motivation on Electrical/Electronic Technology Education lecturers have influence on their use of ICT tools in teaching?

Does location of Electrical/Electronic Technology Education lecturers have any relationship with their quest on adoption of ICT tools in teaching?.

Methods

Design of the Study

The descriptive survey design was used in this study. Uzoagulu (2011) stated that in descriptive survey research design, data are collected, analyzed and then described as they exist without interfering with them. This study adopted descriptive survey because it collected data, examined and described them in a systematic manner and discussed the psychosocial variables influencing Electrical/Electronic Technology Education lecturers use of ICT tools to teach their students.

Area of the Study

The study was carried out in tertiary institutions that offer Electrical/Electronic Technology Education programme in North Western states of Nigeria, being the researcher's Geo- Political region of which he is adapted to. North West Nigeria comprises seven states: Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto and Zamfara.

Population for the Study

The population for the study was 87 Electrical/Electronic Technology Education lecturers in the tertiary institutions offering Electrical/Electronic Technology Education in North Western states of Nigeria, totaling 87. This figure comprised 14 Electrical/Electronic Technology Education lecturers from Kaduna Polytechnic, Kaduna (KADPOLY); eight Electrical/Electronic Technology Education lecturers from Federal College of Education (FCE), Zaria; eight Electrical/Electronic Technology Education lecturers from Kaduna State College of Education (KSCOE), GidanWaya; 14 Electrical/Electronic Technology Education lecturers from Federal College of Education Technical (FCET) BICHI; five Electrical/Electronic Technology Education lecturers from Kano State Polytechnic, Kano (KANOPOLY); five Electrical/Electronic Technology Education lecturers from Sa'adatuRimi College of Education (COE), Kombotso Kano State. Others are eight Electrical/Electronic Technology Education lecturers from Federal College of Education (Technical) (FCET) Gusau; 14 Electrical/Electronic Technology Education lecturers from Federal Polytechnic, Kaura Namoda; six Electrical/Electronic Technology Education lecturers from Abdu Gusau Polytechnic, Talata Mafara; five Electrical/Electronic Technology Education lecturers from College of Education, Manu.

Instrument for Data Collection

The instrument used in this study was a structured questionnaire titled: Psychosocial variables Influence Questionnaire (PVIQ). The instrument was developed by the researcher from literature review and it has parts, A and B. Part A consists of demographic information of the respondents such as Gender, Experience, and

Qualification. Part B contains the questionnaire items generated from literature and are used to elicit information from the respondents on psychosocial variables influencing the use of ICT by Electrical/Electronic Technology Education Lecturers in Teaching in Tertiary Institutions in North Western Nigeria. Part B is divided into six clusters according to research questions. All the Clusters have assigned questions. Cluster A has 12 statements on influence of competence on EE lecturers on utilization of ICT tools in teaching, cluster B has 10 statements on influence of attitude on EE lecturers on utilization of ICT in teaching, cluster C has 15 statements on influence of motivation on EE lecturers on utilization of ICT tools in teaching, cluster D has 10 statements on influence of environment on EE lecturers on utilization of ICT tools in teaching, cluster E has eight statements on influence of peer group on EE lecturers on utilization of ICT tools in teaching and cluster F has nine statements on influence of school administration on EE lecturers on utilization of ICT tools in teaching respectively. A total of 64 items on the Questionnaire.

Validation of the Instrument

The instrument was subjected to face validation by two experts from the Department of Industrial Technical Education University of Nigeria Nsukka and one expert from the Department of Technical Education Kaduna Polytechnic, Kaduna to ascertain the validity of the instrument. The validators examined the instrument and ensured that the items relates to the purpose of the study and research questions. The assessment and input of the validators contributed in making the instrument more adaptive to the purpose of the study.

Reliability of the Instrument

The instrument was trial-tested to ascertain its reliability. The trial-testing was carried out using the sample of the instrument in College of Education Akwanga, Nassarawa State in North-central geo-political zone. Six Electrical/Electronic Technology Education lecturers from the institution were used. The choice of Akwanga is due to common characteristics with the sampled states and also sharing common educational characteristics with North-west. Cronbach Alpha was used to determine the reliability and 0.88 reliability index at 0.05 level of significance was obtained indicating that the Instrument was reliable.

Data Collection

Data were collected by the researcher through Questionnaire titled "PVIQ" (Psychosocial Variables Influence Questionnaire). 87 questionnaires were distributed and 81 successfully retrieved. Three research assistants were briefed by the researcher on what is expected of them on distribution and collection of the questionnaires. Both the researcher and the assistants retrieved the filled questionnaires from the respondents within two weeks.

Data Analysis

The collected data from the respondents were analyzed using mean and standard deviation to answer the research questions. Real limit of numbers was used for interpreting the analyzed data on research questions as follows: Strongly Agree (SA) 3.50 - 4.00, Agree (A) 2.50 - 3.49, Disagree (D) 1.50 - 2.49, Strongly Disagree (SD) 0.50 - 1.49 and Undecided (U) 0.00-0.49.

Table 1: Mean ratings of respondents on influence of competence in ICT on EETE lecturers on their use of ICT tools in teaching EETE.

S/No	Competence in the use of:	N	\bar{X}	SD	DEC
1	asynchronous system of instructional delivery in teaching EETE	81	3.31	0.85	A
2	synchronous system of instructional delivery in teaching EETE	81	3.27	0.77	A
3	simulation software's to teach basic concepts such as ohms law, voltage, wattage	81	2.96	1.28	A
4	animation as instructional resources for teaching abstract topics like logic gate	81	3.16	1.05	A
5	skype in teaching EETE	81	2.93	1.09	A
6	Moodle as instructional medium in teaching EETE	81	2.70	1.31	A
7	power point to explain skills to implore in teaching EETE	81	2.69	1.09	A
8	computer text or other resources to link previous lesson to present	81	2.43	1.06	D
9	computer application such as internet and others to involve learners' participation in classroom's instruction	81	2.47	1.18	D
10	computer software e.g. electronic calculator to deliver lessons in binary theory	81	2.85	1.17	A
11	electrical/electronic tutor to drive home lessons such as tracking of current flow	81	2.73	1.12	A

12	social media such as Facebook, WhatsApp, etc. as instructional medium in teaching EETE	81	2.30	1.16	D
Cluster Mean		81	2.82		

Note: \bar{X} = Mean, SD = Standard Deviation, Dec. = Decision, N = Number of respondents

Table 1 shows the mean and standard deviation of responses of EETE lecturers on influence of competence in ICT on the means for items range from 2.69 to 3.31. This range of means falls within the number of 2.50 – 3.49 which is the range value agreed, indicating that the respondents agreed that competence in ICT influence lecturers use of asynchronous system; synchronous systems, simulation software, animation, Skype and Moodle in teaching. They also agreed that competence in ICT influences their use PowerPoint, computer Application, computer software, and electrical/electronic tutor for instructional delivery. However, item 8, 9 and 12 show mean range from 1.50-2.49 which falls within the range values Disagreed indicates that respondents disagree that competence in ICT influences the use of computer text, computer application, internet and social media in teaching in EETE.

Table 2: Mean ratings of respondents on influence of attitude towards ICT on EETE lecturers on their use of ICT tools in teaching EETE.

S/No	I believe that:	N	\bar{X}	SD	DEC
1	pomposity is a strong drive towards using ICT tools in teaching EETE	81	3.35	0.76	A
2	selfish desire towards ICT is my driving force in using ICT tools for teaching EETE	81	3.32	0.82	A
3	Diligence facilitates regular use of ICT tools in teaching EETE	81	2.91	1.07	A
4	self-esteem is a driving force that make possible use of ICT tools in teaching EETE	81	2.67	1.33	A
5	being confident in myself enable regular use of ICT tools in teaching EETE	81	2.60	1.24	A
6	loyalty to job ethics gives the drive to use ICT tools in teaching EETE	81	2.77	0.90	A
7	aggressive tendency in computer usage enable the use of ICT tools in teaching EETE	81	3.11	0.96	A
8	Being a discipline delegator makes the use of ICT tools in teaching EETE interesting	81	3.00	0.96	A
9	Being a dynamic deliverer encourages the use of ICT tools in teaching EETE	81	2.40	1.55	D
10	Being distinctively different facilitates the use of ICT tools in teaching EETE	81	2.36	1.17	D
Cluster Mean		81	2.42		

Note: \bar{X} = Mean, SD = Standard Deviation, Dec. = Decision, N = Number of respondents

Table 2 shows mean and standard deviation of respondent's responses on influence of EETE lecturers attitude towards ICT in fully adopting ICT tools in teaching EETE. The means of all the items except items 9 and 10 falls within the real limit range of 2.50-3.49 whose value is agreed. This indicates that respondents agree attitude towards ICT such as being pompous, selfishness, diligence, self-esteem, loyalty to job ethics and aggressive tendency affects towards the use of ICT in teaching by lecturers. Also, respondents agree that discipline has influence on lecturers towards the use of ICT to teach. However, item 9 and 10 with real limit range of 1.50-2.49 whose value is disagreed, indicating that the respondents disagree that being dynamic and distinctively different affects the lecturers towards the use of ICT in teaching EETE.

Table 3: Mean ratings of respondents on influence of motivation on EETE lecturers on their use of ICT tools in teaching EETE

S/No		N	\bar{X}	SD	DEC
1	Incentives make me use ICT regularly in teaching EETE	81	3.35	0.76	A
2	Adequate rewards encourage the use of ICT in lesson delivery in EETE	81	3.32	0.82	A
3	Need satisfaction increase desire to use ICT tools in teaching EETE	81	2.91	1.07	A

4	Work appraisal gives more desire to use ICT tools in teaching EETE	81	2.67	1.33	A
5	Work recognition facilitates regular use of ICT tools in teaching EETE	81	2.60	1.24	A
6	Desire to improve in digital technologies is a driving force to use ICT tools in teaching EETE	81	2.77	0.90	A
7	Need to achieve high standard electrical graduates encourage the use of ICT tools regularly in teaching EETE	81	3.11	0.96	A
8	Need to affiliate with modern technologies encourage the use of ICT tools in teaching EETE	81	3.00	0.96	A
9	fear in failing in difficult situations regarding ICT facilitates regular adoption of ICT use in teaching EETE	81	2.40	1.55	D
10	Having intimate relationship with the digital world encourage the use of ICT tools in teaching EETE	81	2.36	1.17	D
11	Being given cold shoulder when approaching ICT challenges deter the use of ICT tools in teaching EETE	81	2.26	1.18	D
12	Incompetence in ICT deters the use of ICT tools in teaching EETE	81	2.75	1.10	A
13	Ability to exert influence on colleagues and students encourages the use of ICT tools to teach EETE	81	2.11	1.06	D
14	Interest in ICT facilitates make the use of its tools as instructional medium in teaching EETE	81	2.72	1.30	A
15	Online training programme on ICT encourage the use of ICT tools to teach EETE	81	2.42	1.16	D
	Cluster Mean	81	2.72		

Note: \bar{X} = Mean, SD = Standard Deviation, Dec. = Decision, N = Number of respondents

Table 3 shows the mean responses Electrical/Electronic Technology Education lecturers influences of motivation towards adopting ICT tools in teaching. All items except 9, 10, 11, 13 and 15 that fall within real limit number range of 1.50-2.49, have the mean rating of real limit number range 2.50-3.49 having the value, Agreed. This indicate that respondents agreed that incentives, adequate rewards, need satisfaction, Work appraisal, Work recognition and Desire to improve in digital technologies are driving forces for lecturers to use ICT tools in teaching EETE. Others are Need to achieve high standard electrical graduates and need to affiliate with modern technologies also facilitate the desire to use ICT tools for instructional delivery.

Table 4: Pearson correlation summary of the relationship between Location and Gender of lecturers towards the use of ICT tools in teaching.

		Location	Gender
Location	Pearson Correlation	1	.201
	Sig. (2-tailed)		.072
	N	81	81
Gender	Pearson Correlation	.201	1
	Sig. (2-tailed)	.072	
	N	81	81

The data in Table 4 explained the relationship between environment (location) and gender of EETE lecturers towards adopting ICT tools in teaching, using Pearson product moment correlation. Data in the Table show a medium, positive relationship between location and gender of EETE lecturers towards utilization of ICT tools for teaching in North-West Nigerian universities This is shown by R-value = 0.201. Therefore, this implied that environment has a significant relationship with gender of lecturers (male or female) in North-West Nigerian universities.

Discussion

The finding of the study regarding competence influencing electrical/electronic technology education lecturers on the use of ICT tools for instructional delivery in their everyday lesson as presented in Table 1 showed that individual ability in the use of both asynchronous and synchronous delivery systems have effect on lecturers on using ICT tools in teaching. It was also found that lecturers' competence on use of animation resources, simulation software, Moodle, Skype, social media, electrical calculator, electrical/electronic tutor are determining factors on the use of ICT tools for teaching. This finding is consistent with Chigona and Chigona

(2010) study to investigate factors affecting the use of ICT for teaching in the Western Cape Schools. The study highlights that incapability of educators to access and use technology affects the adoption and use of ICT tools in educational instructional delivery. This incapability in the use of asynchronous and synchronous systems of instructional delivery and other related ICT technologies have strong effect on educators as barriers in the use of ICT tools in teaching their courses. Though Chigona's study centered on Western Cape of Khanya in South Africa, the finding of this study showed that ability in the use of asynchronous / synchronous systems of instructional delivery, Skype, social media, Moodle, electronic calculator, electrical/electronic tutor and computer affects the use of ICT by lecturers to teach in North west Nigeria.

The finding of the study regarding the influence of attitude on electrical/electronic technology education lecturers on the use of ICT tools to teach as presented on table 2 showed that incentives and adequate rewards are variables that affects lecturers attitude towards the use of ICT tools in instructional delivery. Result of table 2 also showed that when lecturers work is being recognized and appraised, they eventually get facilitated and having more desired to adopt ICT tools to teach. Educators' interest in ICT technologies and online training programme is a driving force for utilization of ICT tools in teaching as shown by the result of table 2. This finding is consistent with Gbadamosi (2017) who reported that teachers' attitude towards ICT had a positive but low correlation with ICT utilization, and the report of Yusuf and Balogun (2011) stating that teachers' attitude towards ICT had a positive but low correlation with ICT utilization. The result however contradicts the report of Zurajo and Rislán (2013) that reported lack of interest in teachers to incorporate ICT in their teaching due to their negligence, or as result of their incompetence to use ICT facilities. The studies showed that association between teachers' ICT utilization and attitude towards ICT is more positive, and implies that as teachers have more positive attitude towards ICT, their utilization of ICT will increase. The finding of this study shows that attitude is a variable affecting electrical/electronic technology education lecturers in adopting ICT tools for teaching.

The finding of the study regarding influence of motivation on electrical/electronic technology education lecturers on adoption of ICT in teaching as shown in table 3 indicated that determination, professionalism and diligence facilitates regular use of ICT by lecturers in teaching. Finding also showed that educators' goal orientation motivates them on regular use of ICT in electrical/electronic technology education instructional delivery. Finding also showed that when lecturers have in depth knowledge of ICT facilities, they are motivated to incorporate its tools as instructional facilities in their everyday teaching.

The finding is consistent with Chigona, Chigona and Davids (2014) study that reported how educators are motivated to use ICT for curriculum delivery. The study showed Work Itself, responsibility and achievement have been identified as some of the most important motivating factors that affect the use of ICTs for curriculum delivery in disadvantaged areas. ICT initiatives in schools depend on educators who are motivated to integrate the technology in their teaching job. The study also showed educators believe that integration of ICT resources in the teaching could be rewarding. Nevertheless, the study showed that where educators found themselves teaching the technology instead of teaching with it, they felt demotivated to use ICTs for instructional delivery. They are therefore bombarded with demotivating factors that influence them not to use the technology in their teaching. In cases where educators derived professional satisfaction when using the technology for teaching, they found the work itself a motivating factor for them to use the ICTs in their teaching. Finding of this study revealed that motivation influences lecturers to use ICT tools for instructional delivery.

The finding of the study regarding influence of environmental perception on electrical/electronic technology education lecturers on adoption of ICT tools for teaching as shown in table 4 reveal that provision of adequate funding for utilization of ICT in institution by schools administration have effect on lecturers' use of ICT to teach. Provisions of e-library by administration within the school environment also affect the use of ICT by lecturers in North West Nigeria to teach. The finding also indicated that other environmental influences include non-conducive teaching-learning environment, scarce availability of ICT resources within the school environment, acute power shortage in schools environment and availability of ICT books within schools environment. Other environmental influence by the finding is epileptic internet services within schools environment. This finding is in tandem with the study by Chiabai, Rübhelke, and Maurer, (2010) conducted in Spain on ICT Application in the Research for Environmental Sustainability. More specifically, they investigate to which extent and in which way ICT is employed in environmental research as a tool to support and develop sustainable strategies. The research sectors they consider in their survey analysis are among the most prominent ones in environmental research including climate change, biodiversity, energy efficiency, and natural resources. Although the study showed the economic relevance analyzed in terms of reduction of research costs, opportunity to transfer ICT tool into business context was established; and to education for e-learning processes, the political perspective comprises of interface with policy-makers, participation of citizens in the decision-making process, and increased public awareness of environmental impacts. The finding of this study showed that environment is a variable affecting electrical/electronic technology education lecturers on the use of ICT tools in teaching in tertiary institutions in North Western Nigeria.

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