



# COMPUTER APPRECIATION AND MICROSOFT ACCESS COMPETENCIES NEEDED BY POLYTECHNIC OFFICE TECHNOLOGY AND MANAGEMENT TEACHERS FOR COMPUTER-AIDED INSTRUCTION

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## ABSTRACT

*It has been suggested that the failure of polytechnic educators to fully embrace computer aided instruction can be blamed on the limitation of teachers in the use appropriate ICT hardware and software. The study identified information and communication competencies needed by polytechnic Office Technology and Management teachers for computer aided instruction in two states of south-western Nigeria. Two specific objectives, two research questions and two null hypotheses guided the conduct of the study. The objectives were to identify computer appreciation and Microsoft access competencies needed by polytechnic office technology and management teachers for computer aided instruction. The population comprised 62 Office Technology and Management teachers in public polytechnics in Ogun and Osun states. No sample was drawn; the entire population was studied. The instrument for data collection was Computer Aided Instruction Competencies Questionnaire (CAICQ) consisting of 23 three items developed by the researcher based on the study purposes and related literature. The instruments were validated by three experts. The reliability test conducted yielded a reliability coefficient of 0.84 using the test-retest method and pearson product moment correlation. The data collected were analyzed using mean and standard deviation for the research questions, while the null hypotheses were tested at 0,05 level of significance using independent samples t-test. The study found that twelve computer appreciation and thirteen Microsoft Access competencies were germane, to the introduction of computer aided instruction in polytechnic Office Technology and Management courses. The study concluded that computer aided instruction could not take off unless OTM teachers acquire computer appreciation and Microsoft Access competencies, among others. The study recommended improvement in staff training and acquisition of necessary facilities and equipment needed for computer aided instruction.*

**Keywords:** computer appreciation, competence; microsoft access, office technology and Management, polytechnic.



## INTRODUCTION

The constant technological changes being witnessed all over the world have created a challenging context for all fields of human endeavour. No human discipline is unaffected by the impact of technology. Technology has also had considerable impact on courses offered in the nation's tertiary institutions including Office Technology and Management (OTM). OTM is nomenclature that replaced Secretarial Studies programme in Nigerian polytechnics as introduced by the National Board for Technical Education (NBTE) in 2004 (Amiaya, 2014). This resulted from extensive reviews of Secretarial Studies curriculum which revealed the need to make graduates ICT compliant in order to fit into the contemporary world of work.

This change in nomenclature, according to Ejeka and Mgboye (2016), was accompanied by a mandatory new curriculum. Ademiluyi and Ademiluyi (2016) posited that a worthwhile OTM curriculum is never static but dynamic. They averred that the OTM programme was designed as a response to the yearnings of the secretarial students and practitioners for an enlarged curriculum, enriched with ICT contents.

Advancement in ICT has made it possible for teachers in different parts of the world to communicate face to face through satellite, video conferencing among others. The rapid advancement in technology has created various educational challenges and has opened new opportunities to improve teaching (Emeasola, 2014). These new opportunities pose enormous challenges to OTM lecturers and society at large. There is therefore an urgent need to ensure that students and the workforce have the right competencies for this evolving sector.

Competencies have been defined as the state or quality of being adequately or well qualified to perform a task (Macquail & Ichakpa, 2014). Competencies, according to Sanchez (2011) are clusters of related knowledge, traits, attitudes and skills that affect a major part of one's job; that correlate with performance on the job; that can be measured against well-accepted standards; and that can be improved via training and development. In the opinion of Archibond, Ogbiji and Anijaobi-Idem (2010), competencies are a set of knowledge, skills and attitudes that an individual possesses, be it technical or non-technical, that will enable him or her to carry out specific tasks or responsibilities related to a specific job.

Computer-Aided Instruction (CAI) according to Ejeka and Nwosu (2018) is a learning technique, usually offline/online, involving interaction of the students with programmed instructional materials. It is an interactive instructional technique whereby a computer is used to present the instructional material and monitor the learning that takes place. Ejeka and Nwosu (2018) noted that CAI uses a combination of text, graphics, sound and video in enhancing the learning process. Agboh (2015) perceived CAI as an automated instructional method in which a computer is used to present an instruction to the learner through an interactive process.

Polytechnic education in Nigeria is recognized as part of tertiary education whose aim is to provide middle-level manpower to man the various sectors of Nigerian economy. Okebukola (2016) posits that the development of polytechnic education is of paramount importance, if Nigeria must compete with other technologically advanced nations. Polytechnic education according to Ojerinde is important because it emphasises practice-based learning and the acquisition of certain life skills. It is a fact that polytechnic education places emphasis on practice-based learning and skill acquisition.



The extent to which OTM teachers can use CAI to pass instruction depend on their level of competence in using it. With the global challenges of this millennium, ICT competence of teachers is necessary in the area of integration and usages of computers, telephones, projectors, power point presentation equipment, the internet among others in their day to day teaching activities.

OTM teachers must acquire CAI competencies in order to deliver the new methods of communication in their teaching programs, for instance the acquisition of power point sub skills will enable them use computers and multi-media projectors to reform their instructional delivery system (Amiaya, 2014). Amiaya believes that the ability of OTM lecturers to use ICT package for teaching courses in OTM depends on their competencies level. They highlight the opportunities that ICT package can present for enhancing the quality of teaching and learning to include: Providing encouragement for OTM teachers and students to reflect on how they teach and learn, applying theory and research on learning and principles of good instruction to designing online learning environments, making teaching (and learning) more visible and public, encouraging collaboration and team work, offering greater access to learning for more people and increasing the skills and status of university teachers.

Archibong, Ogbiji and Anijaobi-Idem (2010) opine that governments, in the world are aware of the significance of CAI educational programmes, and have adopted several measures to promote CAI education by enhancement of education and training programme, providing an enabling environment for the development of CAI, provision of incentives for computerization and automation. Carlson and Gadio (2012) state that teacher/lecturer training in the use of CAI is the best starting point in the ICT policy of a country because they are the key to making learning happen. This according to Archibong, Ogbiji and Anijaobi-Idem, is because teachers who succeed in making use of CAI in their work process, not only contribute to improved learning outcomes in their students, but may also benefit personally from enhanced work productivity, reduced isolation and increased professional satisfaction.

A few studies have associated OTM teachers' mastery of CAI competencies with gender (Amiaya, 2014). Gender in this study refers to male and female polytechnic lecturers. This study sought to investigate whether gender disparity exists on CAI competencies in the study area. This study sought to determine competencies needed for computer-aided instruction by polytechnic office technology and management teachers in Ogun and Osun States and also to determine if variables such as sex and location of teachers have any influence on the competencies needed for CAI by the OTM teachers in Ogun and Osun States.

### **Problem Statement**

The teaching and learning of Office Technology and Management (OTM) formerly known as secretarial studies seems not to have changed from what it was in the past. It is obvious that the use of traditional instructional approach is still the order of the day in the nation's polytechnic especially in Ogun and Osun States even when transformation in nomenclature and curriculum had taken place. Specifically, in this computer age, criticisms abound that many teachers of Office Technology and Management are incompetent in handling Information and Communication Technology (ICT) to teach the courses in polytechnics.

Similarly, where some teachers can make use of ICT, the numbers of those who can utilize ICT facilities in OTM instructional process are still obviously minimal. Also, it is glaring that there

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are shortage of qualified teachers with ICT-skills background in OTM in the existing polytechnics in Ogun and Osun states of Nigeria. Added is that some teachers perhaps due to their volume of academic and administrative responsibilities in the polytechnic find it difficult to proceed in their area of specialization for further professional development and acquisition of ICT-skill based programs which could enhance their teaching and instructional delivery.

The implications of the identified inadequacies may have contributed to the ineffectiveness and inefficiency of OTM graduates in office occupation. To this end, if OTM teachers who facilitate teaching and learning processes are not equipped with the needed CAI competencies, optimal success may not be achieved in making OTM graduates functional and relevant in the contemporary world of work upon graduation. Hence, it is imperative to identify computer-aided instruction competencies needed by polytechnic office technology and management teachers in Ogun and Osun States.

### **Purpose of the Study**

The main purpose of this study was to determine computer-aided instruction competencies needed by polytechnic office technology and management teachers in Ogun and Osun States. Specifically, the study sought to determine:

1. Computer Appreciation competencies needed by Office Technology and Management teachers for computer-aided instruction;
2. Microsoft Access competencies needed by Office Technology and Management teachers for computer-aided instruction;

### **Research Questions**

The following research questions were raised for the study:

1. What are the Computer Appreciation competencies needed by Office Technology and Management teachers for computer-aided instruction?
2. What are the Microsoft Access competencies needed by Office Technology and Management teachers for computer-aided instruction?

### **Research Hypotheses**

The following null hypotheses were tested at .05 level of significance:

**H0<sub>1</sub>:** There is no significant difference in the mean ratings of OTM teachers in Ogun and Osun States on Computer Appreciation competencies needed by Office Technology and Management teachers for computer-aided instruction

**H0<sub>2</sub>:** There is no significant difference in the mean ratings of OTM teachers in Ogun and Osun polytechnics on Microsoft Access competencies needed by Office Technology and Management teachers for computer-aided instruction.

### **Literature Review**

CAI is also known as computer-assisted instruction. Examples of CAI applications include guided drill and practice exercises, computer visualization of complex objects, and computer-facilitated communication between students and teachers. Information that helps teach or encourages interaction can be presented on computers in the form of text or in multimedia formats, which include photographs, videos, animation, speech, and music. The guided drill is a computer program that poses questions to students, returns feedback, and selects additional questions based on the students' responses. Recent guided drill systems incorporate the



principles of education in addition to subject matter knowledge into the computer program. Computers also can help students visualize objects that are difficult or impossible to view. CAI tools, such as word processors, spreadsheets, and data bases, collect, organize, analyze, and transmit information. They also facilitate communication among students, between students and instructors, and beyond the classroom to distant students, instructors, and experts. CAI systems can be categorized based on who controls the progression of the lesson. Early systems were linear presentations of information and guided drill which was directed by the author of the software. In modern systems, especially with visualization systems and simulated environments, control often rests with the students or with the instructors. This permits information to be reviewed or examined out of sequence. Related material also may be explored. In some group, instructional activities such as the lesson can progress according to the dynamics of the group (Ramazan, 2012).

CAI can dramatically increase a student's access to information. The program can adapt to the abilities and preferences of the individual student and increase the amount of personalized instruction a student receives. Many students benefit from the immediate responsiveness of computer interactions and appreciate the self-paced and private learning environment. Moreover, computer-learning experiences often engage the interest of students, motivating them to learn and increasing independence and personal responsibility for education. Although it is difficult to assess the effectiveness of any educational system, numerous studies have reported that CAI is successful in raising examination scores, improving student attitudes, and lowering the amount of time required to master certain material. While study results vary greatly, there is substantial evidence that CAI can enhance learning at all educational levels (Patel, 2013).

According to Allassan and Ezenwa (2013), computer assisted instruction is a new teaching and learning strategy in which the topics to be taught are carefully planned, written and programmed in a computer which could be run at the same time in several computer units and it allows each students to one computer terminal. The instructions are also programmed in a computer disc (CD), which could be played in either audio or video system for the student to learn the programmed at his /her leisure time.

Most recent CAI software integrates features that encourage activities beyond the simple drill-and-practice, such as simulations, graphing and even modelling (Yusuf, 2010). According to Andrews (2012), CAI comprises tutorials (drill and practice - response oriented interaction), problem solving (laboratory and lecture exercises), simulation exercises (in lecture or laboratory settings), enrichment programs, remedial learning (continuous and repetitive), games (applications of problems or concepts) and testing (test banks with evaluation and analysis). Barot (2009) opines that computer provides immediate feedback letting students know of their achievement.

Jenk and Springer (2013) opined that the way CAI is delivered can affect its effectiveness, and that new studies are needed to clarify the effect of CAI in contemporary student environment. Instructional material and strategies through Computer Assisted Instruction have been found to aid academic achievement and retention. Computer technology holds promise for improving student achievement and teacher quality in educational programmes at all levels.

Computer assisted instruction (CAI), combined with traditional methods, was more helpful to students in reaching their educational-training goals.. According to Davidson-Shivers,



Rasmussen, & Lowenthal (2006), one of the most significant advantages of CAI is the potential to individualize instruction so as to meet the particular needs of the student. Moreover, the presentation of the lesson material in various ways (text, audio and graphics) renders teaching by computer an interesting and effective learning tool. While bearing the problems of today's classrooms in mind (overcrowding, educational programme overloading), teachers at all levels are coming to view the use of CAI as a means of improvement of their teaching (Allassan & Ezenwa, 2013).

Computer assisted instruction can be in different modes. These include: Tutorial mode; Informational Instruction, drill and Practice Programmes, Educational Game type, Stimulation Type of Instruction, Problems-solving Type, Practical work-oriented Instruction, Learning Affairs-managing types, Power Point Presentations types (Oduwaiye, 2009). Competencies can be seen as learned responses, often as a result of specific training which afford someone the ability to perform a particular task and achieve a particular objective (Ejeka and Mgbonyebi, 2016).

Computer basic skill involves the use of computers efficiently. Skills on the other hand can simply be perceived as the ability to do things well. Computer appreciation skill can be regarded as the potentials one acquires that makes him or her capable of operating and using the computer efficiently. Performing basic operations like starting a computer, using the mouse, managing various windows, among others may seem like a puzzle to one who has never seen a computer. Allassan and Ezenwa (2013) stated that skills such as turning computer on and off, copying, deleting and renaming files are required in performing basic operations. Allison further stressed that a computer literate teacher must be familiar with computer terms; know how computers work; be able to enter and retrieve data; know the uses of computers; able to programme a computer; know the future general direction of computers; artificial intelligence, and robotics and understand the abuse and misuse of the computer so that students will realize that such problems exists.

Acquisition of these skills will enable the OTM teacher impart instructions on computer appreciation effectively and in its effect be productive in discharging his duties. Computer appreciation deals with all activities involved in coupling and bringing together computer components such as CPU, monitor, mouse, keyboard and others to make a functional unit.

Microsoft access is a form of database management system (DBMS) designed by Microsoft Corporation to facilitate data independence, share ability, consistency and non-redundancy. It is a collection of data items stored with a minimum of duplication so as to provide a consistent and controlled pool of operational data. It is simply information related to a particular subject or purpose such as tracking customer orders.

CAI competencies as used in this study refer to the extent to which OTM teachers in a polytechnic make use of the various ICT tools for passing instructions to students (Magnus, 2014). Azih (2016), listed 59 CAI competencies needed to be possessed by OTM teachers, these include: Ability to create, maintain and modify database, competency in adding and deleting records from database, ability to generate reports from database, among others.

According to Oyinkoye and Oluwalola (2010), Office Technology and Management is a new nomenclature that emerged to replace the former Secretarial Studies Programme and was introduced by the National Board for Technical education in 2004. They both emphasized that



the change was meant to make the programme and its recipients more ICT complaint and to adequately fit into the world of work appropriately, especially in this modern age of globalization, where equipment and new machines are emerging daily.

## **RESEARCH METHODOLOGY**

### **Research Design**

The study adopted descriptive survey design. Agboola (2010) defined descriptive survey design as a broad category of research design which allows assessment of certain attributes. It involves a wide accumulation of data base which may or not necessarily seek explanation of relationship, make prediction or get at meanings and implications of phenomena. Thus, the researcher adopted the descriptive survey design to elicit data from respondents through the aid of questionnaire without any form of manipulation.

### **Area of Study**

The study was carried out in two south western states of Nigeria which comprise Ogun State and Osun State. Most of the polytechnics in these states offer Office Technology and Management (OTM) as a course of study.

### **Population for the Study**

The population for the study consisted of sixty-two (62) OTM teachers in Moshood Abiola Polytechnic Ogun State, Federal Polytechnic Ilaro Ogun State, Ogun State, Institute of Technology Igbesa, Osun State Polytechnic Iree, Osun State, Federal Polytechnic Ede, Osun State.

### **Sample and Sampling Techniques**

Since the population of the study was not too large, and their locations not too dispersed, no sample was drawn. The entire population was studied. This is in consonance with the position of Agboola (2010) who posits that whenever possible, when the population is not too large, the entire population should be studied.

### **Research Instrument**

The instrument for this study was a structured questionnaire tagged Computer-Aided Instruction Competencies Questionnaire (CAICQ). The CAICQ consisted of two parts; I and II. Part I sought demographic data of the respondents while Part II sought data on computer appreciation and Microsoft access competencies needed for CAI.

The scaling response for the instrument was based on adapted Likert Scale ratings viz: Highly Needed (HN) – 4; Needed (N) – 3; Rarely Needed (RN) – 2; Not Needed (NN) – 1`

### **Validation of the Instrument**

The instrument was subjected to face validity by three experts in Business Education, Tai Solarin University of Education. Each of the experts was served with the instrument and requested to critique it in term of phrasing, wording, content coverage and relevance as appropriate. These corrections were taken into cognisance in drawing the final copy of the (CAICQ).

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## Reliability of the Instrument

A test-retest method was used among fifteen OTM teachers from Lagos State Polytechnics, Lagos State. This is because the subjects have similar demographic characteristics as those to be used for the study. Pearson Product Moment Correlation (PPMC) was used to correlate the findings. A reliability coefficient of 0.84 was obtained, which was very high.

## Methods of Data Analysis

The data collected was statistically analysed using mean and standard deviation to answer the research questions while t-test was used to test the null hypotheses at 0.05 level of significance. Any mean score of 2.5 and above was regarded as accepted while any below 2.5 was regarded as rejected. For the t-test, if the t-calculated is less than the alpha significance of .05 the hypothesis was rejected but if the t-calculated is greater than the alpha significance the hypothesis was not rejected.

## RESULTS AND DISCUSSION

This chapter presents the analysis of data collected for the research work. The data analyses were organized based on research questions and the null hypotheses formulated for the study

### Research Question 1

What are the Computer Appreciation competencies needed by Office Technology and Management teachers for computer-aided instruction?

*Table 1: Mean ratings of respondents on Computer Appreciation competencies needed by Office Technology and Management teachers for computer-aided instruction*

S/N	Item Statement	Mean	SD	Remarks
1	Ability to install computer components	3.79	.523	Needed
2	Ability to boot and shut down computer System	3.24	.851	Needed
3	Ability to install computer programmes and soft wares	2.95	.919	Needed
4	Ability to store and retrieve documents in the computer system	3.20	.979	Needed
5	Ability to print documents with the computer system	3.38	.789	Needed
6	Ability to demonstrate file documents on the system	3.41	.689	Needed
7	Ability to use the computer keyboard efficiently	3.27	.746	Needed
8	Ability to use the guide home keys	3.24	.788	Needed
9	Ability to demonstrate correct movement of fingers	3.15	.892	Needed
10	Ability to display power point presentation	3.11	.847	Needed
11	Ability to display competency in power point presentation	2.92	.797	Needed
12	Ability to set up projector for power point Presentation	3.28	.732	Needed

The data presented in Table 1 reveals that all the items (items 1 - 12) had a mean range of 2.9241 to 3.7848. This indicates that the respondents agreed on all the 12 items as Computer





Appreciation competencies needed by Office Technology and Management teachers for computer-aided instruction because their means were above the cut-off point of 2.50. The standard deviation of the items also ranged from .52308 to .97901. This shows that the respondents were close to one another in their responses.

## Research Question 2

What are the Microsoft Access competencies needed by Office Technology and Management teachers for computer-aided instruction?

*Table 2: Mean ratings of respondents on Microsoft Access competencies needed by Office Technology and Management teachers*

S/N	Item Statement	Mean	SD	Remarks
13	Ability to create, maintain and modify Database	3.39	.758	Needed
14	Ability to demonstrate competency in adding and deleting records from database	3.34	.766	Needed
15	Ability to generate reports from Database	3.15	.818	Needed
16	Ability to demonstrate skills in linking information from different environment	3.10	.778	Needed
17	Ability to share information among different workstations	2.99	.793	Needed
18	Ability to use of access environment such as title bar, menu bar among others	3.11	.877	Needed
19	Ability to know how to define a field	2.85	.975	Needed
20	Ability to use if access objects such as tables and forms, query on Microsoft access	3.04	.839	Needed
21	Ability to use tags for various types of objects	3.39	.724	Needed
22	Ability to design tables	3.14	.796	Needed
23	Ability to design fields	3.62	.584	Needed
24	Ability to plan a data base before creating it	3.32	.781	Needed
25	Ability to relate or join tables to one	3.35	.752	Needed

The data presented in table 2 reveals that all the 13 items (items 13 - 25) had a mean range of 2.8481 to 3.6203. This indicates that the respondents agreed on all the 13 items as Microsoft Access competencies needed by Office Technology and Management teachers for computer-aided instruction because their means were above the cut-off point of 2.50. The standard deviation of the items also ranged from .58406 to .97519. This shows that the respondents were close to one another in their responses.

## Test of Hypotheses

### Hypothesis 1

There is no significant difference in the mean ratings of OTM teachers in Ogun and Osun States on Computer Appreciation competencies needed by Office Technology and Management teachers for computer-aided instruction.



*Table 3: The t-test analysis of mean ratings of OTM teachers in Ogun and Osun States on Computer Appreciation competencies.*

Respondents	Mean	SD	n	df	t-cal	t-tab	Decision
Ogun OTM Teachers	3.84	0.04	36	60	0.21	1.68	Not rejected
Osun OTM Teachers	3.60	0.75	26				

The result in Table 3 reveals that the calculated t-value is less than the t-table value of 1.68 at .05 level of significance and 60 degree of freedom. With this result, the null hypothesis ( $H_{o1}$ ) of no significant difference was upheld. This indicates that there was no significant difference between the mean ratings of OTM teachers in Ogun and Osun States on Computer Appreciation competencies needed by Office Technology and Management teachers for computer-aided instruction.

### **Hypothesis 2**

There is no significant difference in the mean ratings of OTM teachers in Ogun and Osun polytechnics on Microsoft Access competencies needed by Office Technology and Management teachers for computer-aided instruction.

*Table 4: The t-test analysis of mean ratings of OTM teachers in Ogun and Osun States on Microsoft Access competencies.*

Respondents	Mean	SD	n	df	t-cal	t-tab	Decision
Ogun OTM Teachers	3.30	0.80	36	60	0.50	1.68	Not rejected
Osun OTM Teachers	3.22	0.87	26				

The result in Table 4 reveals that the calculated t-value is less than the t-table value of 1.68 at .05 level of significance and 60 degree of freedom. With this result, the null hypothesis ( $H_{o1}$ ) of no significant difference was upheld. This indicates that there was no significant difference between the mean ratings of OTM teachers in Ogun and Osun States on Microsoft Access competencies needed by Office Technology and Management teachers for computer-aided instruction.

### **Discussion of Findings**

In research question 1, the findings as shown in Table 1 reveals that twelve computer appreciation competencies were needed by OTM teachers for computer- aided instruction. The findings are in consonance with the positions of Archibong, Ogbiji and Anijaobi-Idem (2010) who believe that the ability of OTM lecturers to use ICT package for teaching courses in OTM depends on their competency levels. Similarly, the result also corroborates Amiaya (2014) that OTM teachers must acquire CAI competencies in order to deliver the new methods of communication in their teaching programmes.



The findings in table 2 reveals that thirteen Microsoft Access competencies are needed by Office Technology and Management teachers for computer-aided instruction. The study of Nnorom, and Gaius-Oke (2013) supported the findings of this study. Nnorom, and Gaius-Oke (2013) note that adequate knowledge of OTM teachers in Microsoft access program will ensure that the graduates of the programme develop relevant and saleable competencies that would enable the recipients to be self-employed and also create employment after graduation.

Table 3 reveals that there was no significant difference in the mean ratings of OTM teachers in Ogun and Osun States on Computer Appreciation competencies needed by Office Technology and Management teachers for computer-aided instruction. Table 4 also reveals that there was no significant difference in the mean ratings of OTM teachers in Ogun and Osun States on Microsoft Access competencies needed by Office Technology and Management teachers for computer-aided instruction. This shows that there was no gender dichotomy in respondents perception of the skills needed for effective computer aided instruction in OTM programmes.

## CONCLUSION

This study was prompted by the need to identify the competencies needed by Polytechnic Offices Technology and Management Teachers for Computer-Aided Instruction in Ogun and Osun states, Nigeria. Computer Appreciation competencies needed for Computer Assisted Instruction are: Competencies in power point presentation, installation of computer programmes and software among others. This shows that in the opinion of the respondents, Computer-Aided Instruction cannot be effectively performed without the competencies stated above.

Microsoft Access competencies needed for computer Assisted Instruction are: Skills in linking information from different environment, knowing how to define a field, designing of tables and so on. This confirms that the importance of Microsoft Access competencies cannot be over-emphasized in any effort to adopt Computer-Aided Instruction.

## Recommendations

Based on the findings of the study, the following recommendations were made:

1. Adequate supply of ICT equipment should be provided to polytechnics.
2. Training and retraining of OTM teachers must be given due cognizance by relevant authorities.
3. Qualified ICT teachers must be employed in Polytechnics in Nigeria.
4. Existing OTM teachers in Polytechnics should be trained along the identified CAI competencies to enable them function as OTM teachers effectively.

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