

E - Learning and C.B.T in Polytechnic Education System in Nigeria

J. A. Ademuyiwa
Senior Lecturer
Department of Statistics
Federal Polytechnic, Ile-Oluji,
Ondo State, Nigeria

I. O. Longe
Senior Lecturer
Department of Statistics
Federal Polytechnic, Ile-Oluji,
Ondo State, Nigeria

ABSTRACT

Information Technology had become a very significant tool in order to ease our daily routines, this applied to Polytechnic Education will enhance and increase the productivity of the Institution.

This research examines the opinion of some students and lecturers in The Federal Polytechnic Ado-Ekiti on the relevance of E learning and CBT in Polytechnic Education system being a practical oriented education system. The opinion of nine hundred and thirty students which represent a good proportion of the students and two hundred and forty academic staffs were examined. Multiple bar chart and Kappa statistic were employed in order to achieve the itemized aim. Based on the analysis, findings and conclusion drawn, E learning and CBT should be encouraged in Polytechnic but with a platform that enhance and develop practical knowledge of the Students.

Keywords

E learning, CBT, Polytechnic Education, Relevance

1. INTRODUCTION

In Recent Years, Information Technology had become a very significant tool in order to ease our daily routines. Several organizations, institutions and individual had accepted the use of Information Technology as a tool that need to be understood and have the ability to properly adapt its usage. However, the use of these technologies which were also designed for other purpose had found its way into the educational environment in such a way that nobody in the educational institution is left out in regard to its usage, starting from the top management, across the staff to the students. The purpose for this is to serve as fuel that increase the momentum for proper academic activities, good administration and to make learning and knowledge gain easy for the students and make learning assessment easier for the academic staff while keeping effective and efficient record by management for various usages. Universities, Polytechnics and other educational institutions are now becoming familiar with the adoption of Information Technology in their system. The type of information technology devised by some of these educational institutions for learning and examination assessment is E-learning and Computer-Based testing (C.B.T) respectively.

E – Learning however, is the use of electronics technology such as mobile phone, computer, radios, television and others to improve learning and teaching activities in educational institutions. According to [13], E-learning is a unifying term used to describe the fields of online learning, web-based training, and technology delivered instructions. In e - Learning environments learners can interact with learning

materials, their instructors and other learners from various locations and often at various times using network technologies. Its nature offers significant flexibility as to when and how learning occurs and can include independent, facilitated, or collaborative approaches to learning.

On the other hand, Computer Base Testing is a method for conducting, processing, recording and assessing examination in an electronic format using computer system in order to assess students based on their courses of study. [7] opine that CBT allows trainers and teachers to plan and report on surveys, quizzes, tests and examinations. Proper application and use of these technologies facilitates learning. With the use of these technologies both the teachers and students had been witnessing an excellent performance in the academic activities. [17] Discovered that students taught with computer mediated learning performed better in class than the conventional students. While computer-based testing is becoming an increasingly accepted testing solution used for conducting examination, there are still many factors that must be considered when choosing and implementing a CBT, such as its acceptance by students, adoption into the academic system, and its influence on students' academic performance.

However, with the inclusion of E – Learning and C.B.T in Polytechnic education system, there is a need to ask questions as to whether these learning systems is applicable to Polytechnic system which was created mainly to provide a wide range of intermediate and higher level technology and technologist as explained by [16]. [12] opines that the decision of the Federal government to set up polytechnic education was predicated in the decision to revolutionize the society technologically. This government's decision copiously spelt out the objectives of Technical and Vocational education (TVE) in [10]. These objectives are:

1. To provide trained man power in applied sciences, technology, commerce and industry.
2. To provide technical knowledge and vocational skills necessary for agricultural, industrial, commercial and economic emancipation and development.

Consequently, to effectively achieve these objectives, there is need for a well-organized practical oriented learning methods and environments such as practical laboratories, workshops, and field works. These however, defeat the usefulness and the effectiveness of C.B.T and E learning in Polytechnic education system being practically oriented. This paper therefore, is aimed at seeking the opinions of lecturers and students as to whether E – learning and C.B.T should be encouraged in Polytechnic Education in Nigeria being practically oriented.

1.1 The Polytechnic Education System

The Polytechnic system was originally adopted from our colonial master. The most important aim of the introduction of the polytechnic education system was to respond to new demands for vocational skills that were seen to arise in the labor market [6[#]]. The creation of the polytechnic system meant a rapid expansion in the provision of higher education. Furthermore, the purpose of the reform was to raise the general educational standard and training of technologist and to diversify higher education. Other objectives included pooling resources into larger units and making the Nigerian education system more comparable to educational systems in other African and European countries. One additional factor that influenced the introduction of polytechnic education was the rapid increase in the number of matriculated students who did not have a student place in higher education.

The polytechnics have between 6000 and 20000 students each ([11]). Most polytechnic schools are multidisciplinary and the network of polytechnics covers the whole country. Indeed, one of the many goals of the polytechnic reform was to promote regional development and meet regional needs for higher education ([11]). Polytechnic certificates are National Diploma (ND) and Higher National Diploma (HND) with a vocational emphasis. These certificates take around 2 to 5 years (including four months SIWES program and one year industrial training) to complete.

The first graduates from the new polytechnics entered the labor market in 1976. The number of graduates grew rapidly and by 2000 the number of polytechnic graduates exceeded the number of new university graduates. The three largest fields were business studies and administration, science and technology, environmental science and engineering. Each year, between eighty and ninety per cent of all polytechnic diploma were awarded in these three fields. The field of study for each student is already determined by the time when a student applies for and is accepted for enrolment in a particular program.

1.2 Statement Of The Problem

The polytechnic education system in Nigeria is widely known to provide technical education to develop technological manpower of the nation's economy. Consequently, this system of education needs a well equip laboratory, workshop and a constant field trip to enhance the achievement of its aim. With a constant yearning for inclusion of E-learning and CBT into this system of education, there is a need to ask whether these platforms can provide the necessary learning environment to develop technological manpower. Hence, the problem of this study is to examine the opinion of Students and Lecturers on the inclusion of these learning environments into polytechnic education system.

Based on the foregoing discourse, the following research questions were raised:

1. Can E – learning enhance the practical knowledge of the students?
2. Do students understand lectures done through E-Learning?
3. Is E-Learning relevant in the polytechnic education system?
4. Can CBT effectively test the practical knowledge of the students?

1.3 Significance Of The Study

Previously, lots of related researches have been done similar to this topic. Different researchers have researched on the acceptability of E Learning and C.B.T among Nigeria students, the contributions of these Learning environments on their academic performance and also examination on the general deficiency of C.B.T and E Learning has been done. This research is different in a way that it is the first research in which we take a look into whether C.B.T and E Learning can fit into the Polytechnic system of education in Nigeria. Our contribution to this study is that we explore the opinion of Polytechnic Students and staff to determine if C.B.T and E Learning are necessary Learning environments in Polytechnics with an understanding of its operation as purely practical based system of education.

This research will be helpful for Polytechnic managements as well as the government of the nation to formulate policy on education as relate to Polytechnic Education.

2. REVIEW OF RELATED LITERATURES

E-learning refers to the use of information and communication technology (ICT) to enhance and/or support learning in tertiary education. However this encompasses an ample array of systems, from students using e-mail and accessing course materials online while following a course on campus to programs delivered entirely online. E-learning can be different types, a campus-based institution may be offering courses, but using E-learning tied to the Internet or other online network (Lorraine M.2007).

Touhid, Sharmin and Aynun, (2014) also refers to E learning as any form of learning which we can access through web enable technology. They added that E learning specifically referred to learning using internet or other interactive or electronic media sources. Another name for it is termed "online learning". It is also a form of distance learning environment which enable learner interact with learning materials and allow trainers to transfer knowledge from a distance. CBT on the other hand, is method of assessing student's knowledge through the use computer system based on their course of study.

Abifarin and Okunloye (2011) admit that one of the major challenges to CBT and E learning is the level of computer literacy among students. For instance, many of the students find it difficult to "log in" for the examination, some of them could not grade themselves, and some could not preview the questions they have answered while some accidentally submit papers before they complete answering them. It took several times for the instructors to go round the students to assist them to "log in" and to solve some other related problems. They continued further by stating that inadequate number of computers and lack of internet facilities is a major challenge to the effectiveness of CBT and E learning. Jimoh (2010) also reported some of the challenges of CBT at the University of Ilorin. He highlighted some of the challenges such as multiple choice and "fill in the gap" format as not sufficient enough to test the ability of students. He also said that the communication skills of the students and creativity in problem-solving could not be adequately assessed.

Abdulrahman, Balogun and Yayah(2014) in their study finds out that that there is significant relationship between computer ownership and the use of technology for examination and technology with students' academic performance. They observed that computer ownership plays an important role

towards student's academic performance. This is also in line with study by Burns (2013) who found that computer ownership to increase student's academic performance in the developed countries. This implies that students who own a computer of their own tends to perform better academically in CBT examinations than those who do not own a computer.

Oye, Iahad and Rahim (2012) also find out that the use of E learning improves student's academic performance. In their study, they examine the application of e learning model to explain student's acceptance of the e learning technology within the academic settings and they find out that in order to foster individual's intention to use an e learning, positive perception on e- learning use is crucial. They continued by stating that one of the most important occurrence is that both perception and intention to use have significant effect on actual E- learning use. While attitudes have influence on intention to use, the actual e learning has significant effect on student's academic performance.

3. REASEARCH METHODOLOGY

In order to achieve the identified aim in this research, bar chart and Kappa are employed for studying agreement or association between two variables

3.1 The Kappa Statistic

Kappa (K) is a statistical tool used as a measure of agreement between two categorical variables. It was suggested by Cohen (1960) hence, it is popularly known as Cohen Kappa statistic. It adjusts the observed proportional agreement to take account of the amount of agreement which would be expected by chance. First we calculate the proportion of units where there is agreement, p , and the proportion of units which would be expected to agree by chance P_e . The expected numbers agreeing are found as in chi-squared tests, by row total times column total divided by grand total.

		CATEGORY A		
CATEGORY		YES	NO	TOTAL
B	YES	A	B	A ₁
	NO	C	D	A ₂
	TOTAL	B ₁	B ₂	N

Where $P = \frac{A+D}{N}$ and P_e is defined as follows:

$$P_e = \left(\frac{A_1}{N}\right)\left(\frac{B_1}{N}\right) + \left(\frac{A_2}{N}\right)\left(\frac{B_2}{N}\right)$$

Therefore, the Kappa statistic is given

$$\kappa = \frac{P - P_e}{1 - P_e}$$

Kappa is thus the agreement adjusted for that expected by chance. It is the amount by which the observed agreement exceeds that expected by chance alone, divided by the maximum which this difference could be.

We will have perfect agreement when all agree so, $P = 1$. For perfect agreement $\kappa = 1$. We may have no agreement in the sense of no relationship, when $P = P_e$ and so $\kappa = 0$. We may also have no agreement when there is an inverse relationship. When have $P < P_e$ and so $\kappa < 0$. The lowest possible value

for κ is $-\frac{P_e}{(1 - P_e)}$, so depending on P_e , κ may take

any negative value. Thus κ is not like a correlation coefficient, lying between -1 and $+1$. Only values between 0 and 1 have any useful meaning. As Fleiss showed, kappa is a form of intra-class correlation coefficient.

Note that kappa is always less than the proportion agreeing, P .

3.2 Interpretation of Kappa

Value of kappa	Strength of agreement
<0.20	Poor
0.21-0.40	Fair
0.41-0.60	Moderate
0.61-0.80	Good
0.81-1.00	Very good

3.3 Standard Error and Confidence Interval for Kappa (κ)

The standard error of κ is given by

$$SE(\kappa) = \sqrt{\frac{P(1 - P)}{n(1 - P_e)^2}}$$

Where n is the number of subjects. The 95% confidence interval for κ is $\kappa - 1.96 \times SE(\kappa)$ to $\kappa + 1.96 \times SE(\kappa)$ as κ is approximately normally Distributed, provided np and $n(1-p)$ are large enough, say greater than five.

We can also carry out a significance test of the null hypothesis of no agreement. The null hypothesis is that in the population $\kappa = 0$, or $P = P_e$. This affects the standard error of kappa because the standard error depends on P , in the same way that it does when comparing two proportions (Bland, 2000). Under the null hypothesis can be replaced by P_e in the standard error formula:

$$SE(\kappa) = \sqrt{\frac{P(1 - P)}{n(1 - P_e)^2}} = \sqrt{\frac{P_e(1 - P_e)}{n(1 - P_e)^2}} = \sqrt{\frac{P_e}{1 - P_e}}$$

If the null hypothesis were true $\kappa SE(\kappa)$ would be from a Standard Normal Distribution. The test is one tailed, as zero and all negative values of κ mean no agreement. Because the confidence interval and the significance test use different standard errors, it is possible to get a significant difference when the confidence interval contains zero. In this case there is evidence of some agreement, but kappa is poorly estimated.

4. DATA ANALYSIS

The data used for this research work is a primary data using questionnaire method. One thousand questionnaires were administered randomly to the students of Federal Polytechnic, Ado Ekiti and Two hundred and fifty questionnaires were also randomly administered to the staff of the school to seek their opinion on the subject matter. However, only nine hundred and thirty questionnaires were recovered for students while only two hundred and forty questionnaires were recovered from the staff.

4.1 Analysis Of Student’s Opinion

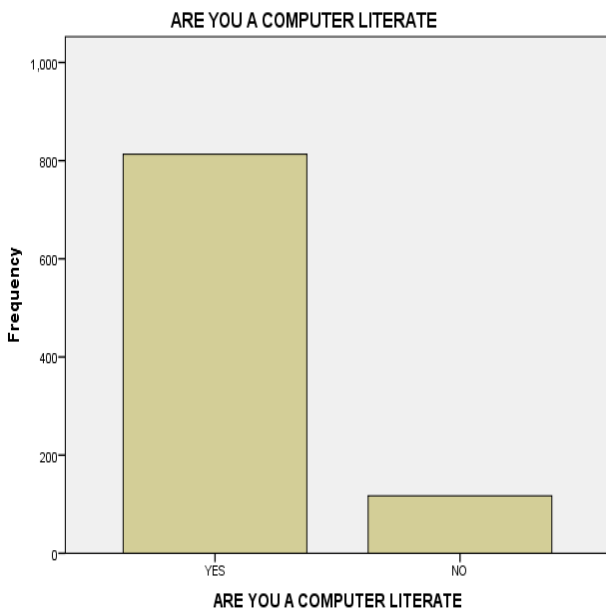


Figure 1: A bar chart showing the frequency of the students who are computer literate

Comments: From the figure above, it is observed that students who have knowledge in computer are higher than those who do not have. This may serve as a very good avenue for easy operation of E learning and CBT

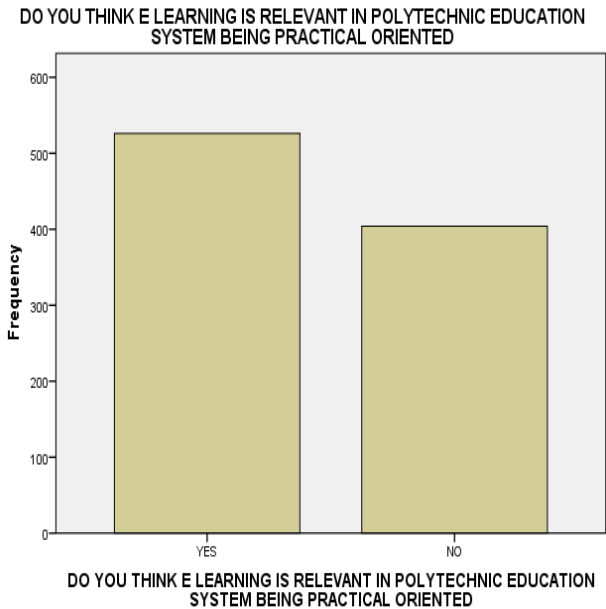


Figure 2: A bar chart showing the frequency of student’s opinion on the relevance of E learning

COMMENT: From the figure above, it can be observed that the frequencies of students who agree that E learning is relevant in polytechnic Education system are more than those who do not agree. This can be as a result of the student’s exposure to computer since large frequencies of the students are computer literate.

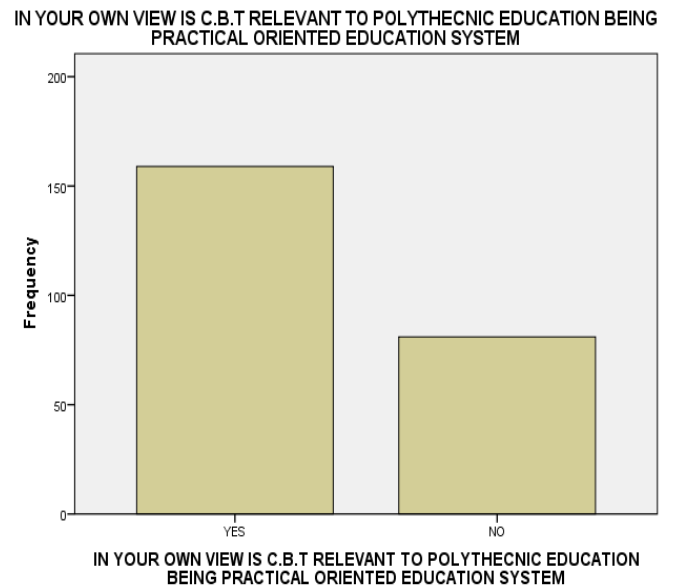


Figure 3: A bar chart showing students opinion on relevance of CBT in polytechnic

COMMENT: From the figure above, it is also observed that frequencies of students who opined that CBT is relevant in Polytechnic Education are higher. This may also be determined by the higher frequencies of students who are computer literate.

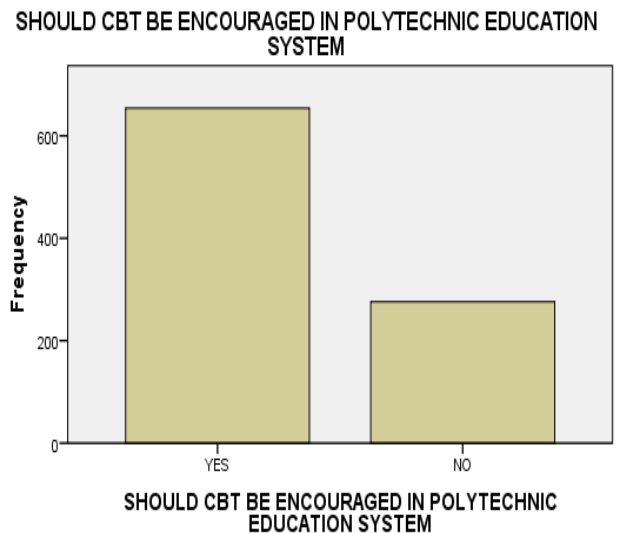


Figure 4: A bar chart showing student’s opinion on whether CBT should be encouraged in polytechnic or not

Comment: From the figure above, it is obvious that frequencies of students who are opined that CBT should be encouraged in Polytechnic Education are higher. This may also be determined by the higher frequencies of students who are computer literate.

Table 1: Comparing the students computer literacy to their opinion on relevance of E learning

		DO YOU THINK E LEARNING IS RELEVANT IN POLYTECHNIC EDUCATION SYSTEM BEING PRACTICAL ORIENTED		Total
		YES	NO	
ARE YOU A COMPUTER LITERATE	YES	457	356	813
	NO	69	48	117
	Total	526	404	930

Comment: This contingency table is frequency of student's literacy in computer and opinion on E learning

Table 2: Output of the Comparison student computer literacy and opinion on relevance of E learning using Kappa statistic

	Value	Asym p. Std. Error ^a	Approx. T ^b	Approx. Sig.
Measure of Agreement Kappa	-.013	.024	-.564	.573
N of Valid Cases	930			

Comment: Based on table 2 above it can be concluded that the measure of agreement between Students who are computer literate and opinion on the relevance of E learning in polytechnic education is poor since the value of kappa is < 0.20. Also, the significant value (0.573) shows that the relationship between the two variables is not significant. This defeat the assumption made in figure 2 that their opinion on the relevance of E learning in polytechnic is as a result of their high level of computer literacy.

Table 3: Comparing the students opinion of gaining practical knowledge through E learning to their opinion on relevance of E learning

		DO YOU THINK E LEARNING IS RELEVANT IN POLYTECHNIC EDUCATION SYSTEM BEING PRACTICAL ORIENTED?		Total
		YES	NO	
CAN E LEARNING ENHANCE YOUR PRACTICAL KNOWLEDGE?	YES	414	117	531
	NO	112	287	399
	Total	526	404	930

Comments: The contingency table is the frequency of student's opinion on gaining practical knowledge through E learning and their opinion on its relevance to Polytechnic Education. The frequencies of students who agree and disagree are 414 and 287 respectively.

Table 4: Output of the comparison of gaining knowledge through E learning and relevance of E learning in polytechnic

	Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Measure of Kapp Agreement a	.498	.029	15.193	.000
N of Valid Cases	930			

Comments: The table 4 above, the value of kappa is 0.498 this shows that there is a moderate agreement between the student's opinion on how E learning can enhance their practical knowledge and their opinion on whether E learning is relevant to polytechnic Education. The significant value of 0.00 shows the relationship is significant. This implies that the students who agree that E learning can enhance their practical knowledge and that E learning is relevant in polytechnic education are equivalent. Also, the frequency of students who opposes the assertions is equivalent. However, from table 3, it is obvious the frequencies of students who agree with both assertions are higher. This mean that the students moderately agree that E learning can enhance their practical knowledge and that it is relevant in Polytechnic settings.

Table 5: Comparing the students opinion of testing practical knowledge through CBT to their preference for CBT

		CAN CBT EFFECTIVELY TEST YOUR PRACTICAL KNOWLEDGE OF THE COURSE YOU OFFER		Total
		YES	NO	
DO YOU PREFER MORE THAN ANY OTHER TEST TYPE	YES	448	155	603
	NO	150	177	327
	Total	598	332	930

Comments: The contingency table is the frequency of student's opinion on testing practical knowledge through CBT and preference for CBT. The frequencies of students who agree and disagree are 448 and 177 respectively.

Table 6: Output of the comparison of testing practical knowledge through CBT and Preference of CBT in polytechnic

	Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Measure of Kapp Agreement a	.283	.033	8.638	.000
N of Valid Cases	930			

Comments: The table6 above tells us that the agreement between the student's opinion on testing practical knowledge through CBT and preference for CBT is a fair agreement. The relationship is also significant. This implies that the students fairly agreed with CBT ability test their practical knowledge and their preference of CBT in polytechnic education. This means that the students fairly agreed that CBT can test their practical knowledge and that it is relevant in Polytechnic settings.

4.2 Analysis for Staff Response

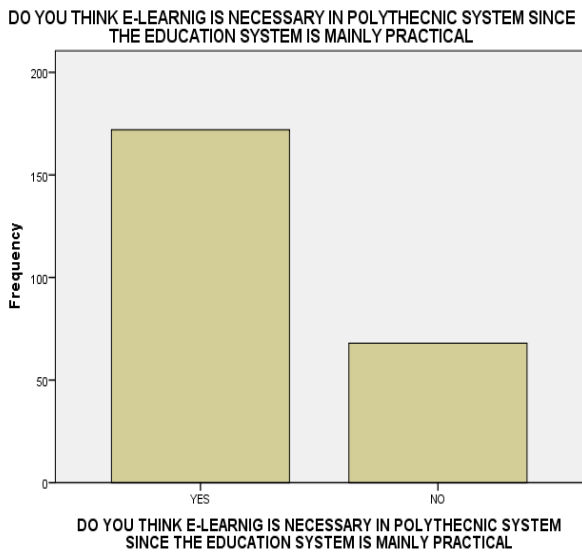


Figure 5: A bar chart showing the opinion of the staffs on relevant of E learning in Polytechnic

Comments: The chart in figure 5 above shows that the frequency of the staff who agrees that CBT should be encouraged in Polytechnic Education is higher than those who do not agree

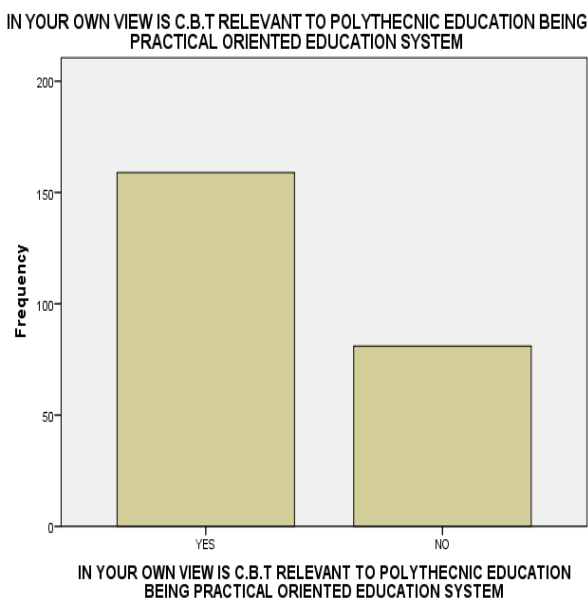


Figure 7: A bar chart showing staff opinion on whether CBT is relevant in Polytechnic Education

Comment: Figure 7 above shows that the frequency of staff who opined that CBT is relevant in Polytechnic Education is higher than those who disagree

Table 7: Comparing staff opinion on whether E learning can effectively develop practical knowledge of students to their opinion on the relevance of E learning in Polytechnic Education

	Do You Think E-Learnig Is Necessary In Polythecnic System Since The Education System Is Mainly Practical	Total		
		YES	NO	
Can E-Learning Effectively Develop The Practical Knowledge Of Students	YES	161	43	204
	NO	11	25	36
Total		172	68	240

Comment: The contingency table is the frequency of staff's opinion on developing practical knowledge of students through E learning and opinion on the relevance of E learning in Polytechnic Education. The frequencies of staff that agree and disagree were 161 and 25 respectively.

Table 8: Output of the comparison of staff's opinion on whether E Learning can effectively develop practical knowledge of students to their opinion on the relevance of E learning in Polytechnic Education

	Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Measure of Kapp Agreement a	.354	.067	5.937	.000
N of Valid Cases	240			

Comment: The value of kappa (0.354) shows that there is moderate agreement between the opinion of the staffs on developing practical knowledge of students through E learning and relevance of E learning to Polytechnic. Also, the significant value shows that the relationship between the two variables is significant. However, from table 7 above, the frequency of staff who agrees to the assertions are higher.

Table 9: Comparing staff opinion on whether CBT can effectively test practical knowledge of students to their opinion on the relevance of CBT in Polytechnic Education

	Do You Think C.B.T Can Effectively Test The Practical Knowledge Of The Students	Total		
		YES	NO	
In Your Own View Is C.B.T Relevant To Polythecnic Education Being Practical Oriented Education System	YES	142	17	159
	NO	46	35	81
Total		188	52	240

Comment: The contingency table is the frequency of staff's opinion on testing practical knowledge of students through CBT and opinion on the relevance of CBT in Polytechnic Education. The frequencies of staff that agree and disagree were 142 and 35 respectively.

Table 10: Output of the comparison of staff's opinion on whether CBT can effectively test practical knowledge of

students to their opinion on the relevance of CBT in Polytechnic Education

	Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Measure of Kapp Agreement a	.356	.063	5.782	.000
N of Valid Cases	240			

Comment: The value of kappa (0.356) shows that there is moderate agreement between the opinion of the staffs on testing practical knowledge of students through CBT and relevance of CBT to Polytechnic. Also, the significant value shows that the relationship between the two variables is significant. However, from table 9 above, the frequency of staff who agrees to the assertions are higher.

5. FINDINGS AND CONCLUSION

Based on the analysis employed in this study, the frequency of students who agree that E-learning is relevant in polytechnic Education system is higher than those who do not agree. This may be consequent upon the high number of students who are computer literate. However, Kappa statistic shows that their level of computer literacy does not affect their opinion on relevance of E-learning in Polytechnic. Also, the frequencies of students who agree that CBT is relevant and should be encouraged in polytechnic are higher than those who do not agree. The kappa statistic used shows that there is moderate agreement between student's response to whether E learning can test their practical knowledge and their opinion on the relevance of it in Polytechnic Education. Also, kappa shows that the agreement between how CBT can test their practical knowledge and their preference for it is a weak or fair agreement.

Furthermore, the frequencies of staff who also agree that CBT and E learning is relevant should be encouraged in Polytechnic Education are higher than those who do not agree. The kappa statistic shows the agreement among these relationships is a moderate agreement.

In consequence of these findings, it can be concluded that both the students and the staff in Federal Polytechnic, Ado Ekiti moderately agree that E learning and CBT should be encouraged in Polytechnic Education system.

6. RECOMMENDATION

Based on the conclusion in this study, it is recommended that E learning and CBT should be encouraged in Polytechnic system and the platforms should be developed in such a way that it will develop and enhance practical and technological manpower of the students. The implication of this is that the purpose for establishing Polytechnic Education can still be accomplished using the E learning and CBT platform

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