

Students' Acceptability and Attitude towards the Computer-Based Test (CBT) Mode for Testing Undergraduates in a Nigeria University

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Abstract

Undergraduates' acceptability and attitude towards CBT as the general mode of testing in undergraduate programs were considered in this study. The survey research design was adopted; the population consists of the students in the Faculty of Education at the University of Benin. A sample of 200 was drawn from the total number of students by random sampling. The instrument – *Students Attitude and Acceptability of the CBT Scale* – was used for data collection, it was developed by the researchers, and the instrument had a reliability coefficient of .076 and .082 for sections B and C respectively. Descriptive statistics (Mean and Standard Deviation) were used in answering the research questions while inferential statistics (t-test and ANOVA) were used for hypotheses testing. All statistical data analysis were done using the IBM-SPSS statistical package version 20. Findings revealed that the students have positive Attitude towards the CBT and the level of acceptability of the CBT was found to be high. However, there was no significant difference in the attitude and acceptability by sex, but there was a difference in acceptability by area of study whereas there was none in attitude. It was recommended among others that CBT be introduced as the general mode of testing in the undergraduate programmes except otherwise, in areas where it is not practicable.

Keywords: *Acceptability, Attitude, Computer-Based Test (CBT), Technology Acceptance Model (TAM), Testing, Undergraduate.*

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INTRODUCTION

The time we are present is dubbed the 'digital age'. Many activities and processes hitherto done manually have been computerized, and many children 'digital natives' are now growing up interacting almost daily with the computer or digital devices. Information and communication technology appears to be the norm as against what was obtainable before now. The computer is at the heart of the 'digital age'. Knowledge and use of computers is increasingly emphasized and taught in schools and also assessment of students using the computer has emerged in the form of the computer-based test.

Computer-Based Test (CBT) is a system of using the computer as a channel for delivering a test to testees as against the traditional pen-paper mode of testing. The computer is gaining in popularity in the present time driven by technology, communication, and information speedway. Many things that are hitherto done manually are being digitalized and this is perhaps gaining momentum by the day. The popularity of CBT is among others, linked with the ease, economy, speed, and accuracy associated with its use both in terms of testing and processing of testees' responses, little wonder many large-scale testing bodies have and are embracing the use of the CBT.

The adoption of the CBT by many testing and examination bodies notwithstanding, many institutions of higher learning still rely on the pen-paper mode of testing either in part or whole. Students of the University of Benin, Nigeria are not aliens to the CBT because; they have had a taste of it at least twice in their testing exercises– the Unified Tertiary Matriculation Examination (UTME) and the Post Unified Tertiary Matriculation Examination (PUTME) - before their eventual admission into the university, when they are successful. The UTME is conducted by the Joint Admission and Matriculation Board (JAMB) a public examination body, for all intending candidates seeking admission into any university in Nigeria while the PUTME is conducted by some of the universities they are seeking admission from. The universities invite candidates whom they have assessed to have met their criteria. The University of Benin invites candidates who scored above 200 points in the UTME for further assessment before consideration for admission.

Though undergraduates of the University of Benin have encountered the CBT twice (UTME & PUTME) some of them, from observation and interaction still find it not acceptable, if it is to be used for all subsequent testing throughout their undergraduate programs. This study investigated the attitude- Psychological Disposition for or against - as well as their level of acceptability – embrace of CBT as a mode of testing in undergraduate programs.

Tests and Computer-Based Test

Education test refers to any tool that is intended to be used to collect data on student's knowledge about a subject matter, psychological disposition, skill, or ability to complete a particular task (Rhalmi, 2018; Omorogiuwa, 2010). Adom *et al.*, (2020) reported, in educational practice, tests are methods used to determine the student's ability to complete certain tasks or demonstrate mastery of a skill or knowledge of content. Hence in education tests could be classified as achievement tests or psychological tests. A psychological test is a tool intended to be used to gather data that are psychological in nature while an achievement test refers to those educational tests intended to be used to gather students' data about how much they have learned a given content after an instructional experience. In this study, the focus is on achievement tests.

An achievement test is a test that is constructed with a given body of knowledge and some instructional objectives in mind. This type of test is intended to be presented to testees and they are to respond to the test items under a given condition with the hope that from their responses to the test items their knowledge gain and mastery of the learned content can be indirectly derived. This type of test can be administered either using the traditional pen-paper mode of test administration or using the CBT mode of test administration.

The CBT is a mode for the administration of an achievement test using the computer as a medium for presenting the test and providing for the testees to input their responses. This mode of test administration is being lauded as the answer to having cheaper and speedier test delivery for state and district-wide assessments (Thurlow *et al.*, 2010). Also, the demand for computer-based testing processes is on the increase, this has been pole-vaulted by experiences presented to education sector by the COVID-19 pandemic challenges. Education sector worldwide is adjusting and increasing preparations to forestall or ameliorate such educational disruption as experienced during the pandemic period should there be similar circumstances in the future. This

notwithstanding the acceptability of the technology is vital. The Technology Acceptance Model (TAM) proposed by Davis, (1989) as presented by Jimoh *et al.*, (2012) is predicated on the premise that for the successful adoption of any technology, there must be; two particular beliefs, Perceived Usefulness (U) and Perceived Ease of Use (E).as these are strongly related to the behavioral intention of use.

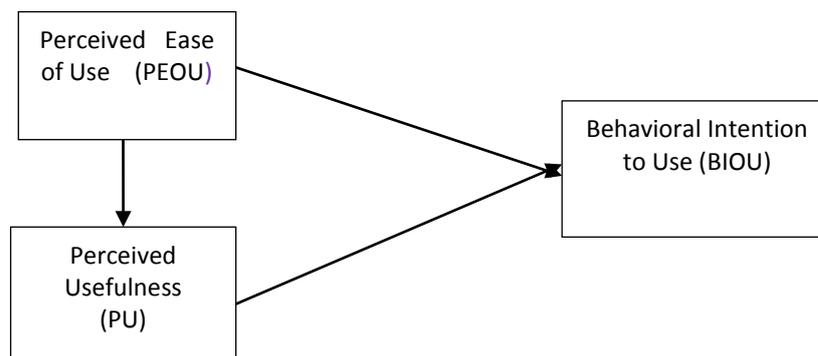


Figure 1: Technology Acceptance Model (TAM): (Davis, 1989)

Students' perceived usefulness of the technology in test delivery is very important in the behavioural disposition that they will have towards the CBT also the perceived ease of use can equally play a significant role in the behavioural intention. The behavioral intention of undergraduates manifests in attitude and acceptability of the CBT.

Attitude is a disposition towards an object, person, or phenomenon. According to Kendra, (2023) Psychologists define attitudes as a learned tendency to evaluate things in a certain way. This can include evaluations of people, issues, objects, or events. Such evaluations are often positive or negative, but they can also be uncertain at times. While to some other scholars; Attitude can be defined as how a person views and evaluates something or someone, a predisposition or a tendency to respond positively or negatively toward a certain idea, object, person, or situation. (Vargas-Sánchez *et al.*, 2016)

There is a consensus among researchers and psychologists alike that attitude is comprised of three components: cognitive, affective, and behavioral aspects. Vargas-Sánchez *et al.*, (2016) succinctly put it this way: Cognitive (perceptions and beliefs), Affective (likes and dislikes, feelings, or evoked emotions), and Behavioral (actions or expressed intentions toward the object based upon the “cognitive” and “affective” responses).

Attitude towards the CBT and the acceptability of CBT are intrinsically intertwined. For a new technology to be accepted or not, is behaviorally dependent which also can be linked with attitudinal disposition. Sidani *et al.*, (2009) cited in Sekhon *et al.*, (2017), submitted in their medical research that acceptability is dependent on patients' attitude toward treatment options and their judgment of perceived acceptability before participating in an intervention.

Acceptability refers to determining how well an intervention will be received by the target population and the extent to which the new intervention or its components might meet the needs of the target population and organizational setting (Ayala and Elder, 2011). For a successful implementation of the CBT in test administration in the undergraduate program a considerable level of acceptability is needed on the part of the recipients the students, to achieve the desired result efficiently. Research has been carried out by scholars to determine the attitude and acceptability of CBT at different times and places.

Statement of the Problem

Students of the University of Benin are tested using the paper-and-pencil mode of testing in their undergraduate examinations. There is a wave blowing across the educational landscape in

Nigeria whereby many schools, most especially privately owned institutions of higher learning are increasingly adopting the use of the CBT. It has also been brought to the forefront of the academic community the inherent benefits of the use of the CBT mode of testing.

However, many government (federal and state) institutions still have not fully keyed into the use of CBT, similarly, students are not clamoring for it, even in the face of their seemingly disadvantaged position of delay in result processing, sometimes the result of some candidates are missing when results are eventually released and in some cases, mix-ups in result presentation among others negative effects the paper-and-pencil mode has on them.

Could this silence on the part of the student be emanating from an attitudinal disposition or the position of not accepting it, maybe for some other reasons best known to them? Even though they have experienced it before, in the admission screening testing, the Post Unified Tertiary Matriculation Examination (PUTME), and the numerous benefits that will accrue to them from the adoption of the CBT.

Empirical Reviews

Since the advent of computers in the field of educational testing, researchers have been investigating the attitude and acceptability of this digital initiative by students and also making comparisons in performance between the traditional pen-paper and the CBT modes of test administration.

Adeyinka and Bashorun, (2012) in a study of undergraduates in a federal university in Nigeria reported that students have a positive attitude towards the CBT and that more than half of the respondents prefer the CBT to the pen-paper mode. Also, a study done by Monirosadat *et al.*, (2014) reported that Iranian students have a positive attitude toward CBT and expressed a preference for CBT, however, they stated that the Iranian students performed better in the pen-paper test than in the CBT this contrast that they saw, to them was problematic and needed further investigation.

Similarly, Okocha *et al.*, (2017) reported that the level of acceptance of CBT is high among students in a privately owned university in Nigeria and they reported sex differences in the level of acceptance. In the same vein, Idhalama *et al.*, (2020) in their study investigated the behavioral tendencies of Nigerian students toward CBT, there they affirmed that library and information science undergraduates expressed their preference for CBT and that the majority of the respondents had a positive attitude towards the computer-based mode of testing, they equally said that the attitude of the undergraduates are statistically the same irrespective of their universities whether it is federal, state or privately owned.

In a study conducted by Olushola *et al.*, (2018) among undergraduates at the University of Ilorin, Nigeria, they asserted that there exists a difference between males and females in their attitude towards and acceptability of CBT. In a similar study conducted by Aletan *et al.*, (2022) at the University of Lagos, Nigeria, they too concluded that there is no gender difference in the views and attitudes of undergraduates toward the CBT mode of examination.

In the same vein, Salihu *et al.*, (2020) concluded that students and examiners alike have positive attitudes toward CBT in the JAMB UTME in Kaduna State, Nigeria, and that there was no significant difference in attitude for male and female students. Yu, and Iwashita, (2021) a study conducted in China reported that 50% of the study participants had a positive attitude toward CBT and also that their scores in CBT and Paper-and-Pencil Test (PPT) were significantly comparable.

In another study Shobayo *et al.*, (2022) to ascertain the effectiveness of computer-based tests among undergraduates in some selected institutions of higher learning in Nigeria. The researchers concluded that the students have a favorable disposition towards CBT and that they equally attest to the fact that CBT is an effective means of testing and assessment in undergraduate programs.

Contrary to the above submissions, Sulaiman *et al.*, (2017) asserted that undergraduates in Ekiti State, have a negative attitude towards the CBT, however, they reported sex difference in attitude with the female respondents having a more positive attitude toward the CBT than the males.

Research Questions

The research questions that gave direction and focus to the study are presented:

1. What is the attitude of undergraduates toward CBT as the general mode of testing in undergraduate programs?
2. What is the level of acceptability of CBT as the general mode of testing in undergraduate programs?
3. Is there a difference between male and female undergraduates in their mean score in attitude towards the CBT?
4. Is there a difference between male and female undergraduates in their mean score in acceptability of the CBT?
5. Is there a difference in the mean score in attitude towards CBT among undergraduates in different study areas?
6. Is there a difference in the mean score in acceptability of the CBT among undergraduates in different study areas?

Hypotheses

The following hypotheses are tested to point to a statistical difference or otherwise of the acceptability and attitude towards CBT in terms of the sex and study areas of the undergraduates

1. There is no significant difference between male and female undergraduates in mean score in attitude towards the CBT
2. There is no significant difference between male and female undergraduates in mean score in acceptability of the CBT
3. There is no significant difference in mean score in attitude towards CBT among undergraduates in different study areas
4. There is no significant difference in mean score in acceptability of the CBT among undergraduates in different study areas

Purpose of the study

The purpose of this study was to ascertain the attitude of the undergraduates of the University of Benin, Nigeria towards the computer-based Test as a general mode of testing in all undergraduate programmes. And also to determine their level of acceptability of the CBT and to find out if there exists or not, gender difference in terms of attitude towards the CBT and acceptability of the CBT. The researchers equally were on the lookout for whether the undergraduates differ in attitude and acceptability when looked at from the perspectives of the students in various disciplines Sciences, Social Sciences, and Arts-based disciplines.

METHODOLOGY

The survey research design was adopted in this study; the population consisted of 6,728 full-time undergraduates in the Faculty of Education University of Benin in the 2021/2022 academic session. The simple random sampling technique was used in the selection of 200 respondents to the questionnaire tagged “Attitude and Acceptance of the Computer-Based Test Scale” The instrument was developed by the researchers and it was partitioned into three sections; “Section A” for demographic information “Section B” contains 10 items measuring attitude towards CBT while “Section C” contains 10 items measuring acceptance of the CBT. The instrument had a reliability coefficient of .076 and .082 for sections B and C respectively. The questionnaire format

(Sections B & C) was the four-point Likert type scale of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD) respectively. The responses were coded as follows: SA (4), A (3), D (2), and SD (1) for positively worded items and coded in the reverse order for negatively worded items. The composite score for sections B and C of the instrument constituted the measure of attitude and acceptability respectively. A high score in section B represents a positive attitude while a high score in section C represents a high level of acceptability otherwise low. Research questions one and two were answered descriptively while research questions three to six were hypothesized as hypotheses 1 - 4 and tested at a .05 alpha level of statistical significance.

RESULTS

Data obtained from the field were analyzed, and the results from the analysis were presented, starting with the research questions and then followed by the hypotheses. The answers to research questions 3-6 can be deduced from the presented results of their corresponding hypotheses.

Research Questions 1: What is the attitude of undergraduates toward CBT?

Table 1: Attitude of Undergraduates toward the CBT

| Variable | N | Sum | Mean | Std. Dev | Cut-off Mean | Remarks |
|----------|-----|------|--------------|----------|--------------|-----------------|
| Attitude | 200 | 5460 | 27.30 | 4.31 | 25.0 | Positive |

Table 1 contains the descriptive data concerning the attitude of undergraduates toward CBT. From the table, the total number of respondents $N = 200$, and the mean score = 27.30 ± 4.31 Standard Deviation. The mean score in attitude when compared with the cut-off mean (scale average) is greater. Therefore, it is the case that on average, undergraduates have a positive attitude toward CBT.

Research Questions 2: What is the level of acceptability of CBT as the general mode of testing in undergraduate programs?

Table 2: Level of Acceptability of the CBT among Undergraduates

| Variable | N | Sum | Mean | Std.Dev | Cut-off Mean | Remarks |
|---------------|-----|------|--------------|---------|--------------|-------------|
| Acceptability | 200 | 5910 | 29.55 | 4.78 | 25.0 | High |

Table 2 contains the descriptive data concerning the level of acceptability of CBT among undergraduates. From the table, the total number of respondents is $N = 200$, and the mean score = 29.55 ± 4.78 Standard Deviation. The mean score in acceptability when compared with the Cut-off Mean, is greater. Therefore, it is the case that on average, the undergraduates have a high level of acceptability of the CBT.

Hypotheses Testing

1. There is no significant difference between male and female undergraduates in mean score in attitude towards the CBT

Table 3: Difference in Attitude towards the CBT between Male and Female Undergraduates

| Sex | N | Mean | Std. Dev. | df | t-value | p-value (Sig. 2-tailed) |
|--------|-----|--------------|-----------|-----|--------------|----------------------------|
| Male | 102 | 26.98 | 3.79 | 198 | 1.070 | .286 |
| Female | 98 | 27.63 | 4.79 | | | |

Table 3 shows the difference between male and female undergraduates in mean score in attitude towards the CBT. From the table, the number of respondents is N (Male = 102; Female = 98) while Mean values and (standard deviations) are 26.98 (3.79) and 27.63 (4.79) for male and female students respectively. The t-value of 1.070 is not significant, because, the *p-value* (.286) is greater than *the alpha level*. Therefore, the null hypothesis is retained. This implies that both male and female students have the same attitude toward CBT as the general mode of testing in undergraduate programs.

2. There is no significant difference between male and female undergraduates in mean score in acceptability of the CBT

Table 4: Difference in Acceptance of the CBT between Male and Female undergraduates

| Sex | N | Mean | Std. Dev. | df | t-value | p-value (Sig. 2-tailed) |
|--------|-----|--------------|-----------|-----|--------------|----------------------------|
| Male | 102 | 29.88 | 4.45 | 198 | 1.002 | .317 |
| Female | 98 | 29.20 | 5.11 | | | |

Table 4 shows the difference between male and female undergraduates in mean score in acceptability of the CBT. From the table, the number of respondents is N (Male = 102; Female = 98) while Mean values and (standard deviations) are 29.88 (4.45) and 29.20 (5.11) for male and female students respectively. The t-value of 1.002 is not significant, because, the *p-value* (.317) is greater than *the alpha level*. Therefore, the null hypothesis is retained. This implies that both male and female students are on the same level in the acceptability of CBT as the general mode of testing in undergraduate programs.

3. There is no significant difference in mean score in attitude towards CBT among undergraduates in different study areas

Table 5: Undergraduates Score in Attitude towards the CBT by Subject Areas

| Study Area | N | Mean | Std. Deviation |
|-----------------|------------|--------------|----------------|
| Sciences | 42 | 26.24 | 2.78 |
| Social Sciences | 62 | 27.52 | 4.63 |
| Arts | 96 | 27.63 | 4.61 |
| Total | 200 | 27.30 | 4.31 |

Table 5 shows the Descriptive Statistics of undergraduates' Scores in Attitude towards the CBT by Subject Areas. From the table, Science-based students (N = 42, Mean = 26.24 Std. Dev. = 2.78). Social Science-based students, (N = 62, Mean = 27.52 Std. Dev. = 4.63) while Arts courses-based students (N=96, Mean = 27.63 Std. Dev.= 4.61). Total respondents (N = 200, Mean = 27.30 Std.Dev.= 4.31).

Table 6: Difference in Mean Score in Attitude towards the CBT by Subject Areas

| | Sum of Squares | df | Mean Square | F | Sig.(p-value) |
|----------------|----------------|-----|-------------|-------|---------------|
| Between Groups | 60.397 | 2 | 30.199 | 1.635 | .197 |
| Within Groups | 3637.603 | 197 | 18.465 | | |
| Total | 3698.000 | 199 | | | |

Table 6 contains the ANOVA result of the significant difference in Mean Score in Attitude towards the CBT by Subject Areas. From the table the *F-value* is = 1.635 and a *p-value* = .197. Testing at alpha level of .05 the *p-value* is greater than the alpha value; (.197 > .05), therefore the null hypothesis is retained; hence any observed difference in the mean scores does not represent a real difference, it is treated as a mere chance occurrence.

4. There is no significant difference in mean score in acceptability of the CBT among undergraduates in different study areas

Table 7: Undergraduates Mean Score in Acceptability of the CBT by Subject Areas

| Study Area | N | Mean | Std. Deviation |
|-----------------|------------|--------------|----------------|
| Sciences | 42 | 30.14 | 4.28 |
| Social Sciences | 62 | 31.58 | 3.86 |
| Arts | 96 | 27.98 | 5.01 |
| Total | 200 | 29.55 | 4.78 |

Table 7 shows the Descriptive Statistics of undergraduates' Scores in acceptability of the CBT by Subject Areas. From the table, Science-based students (N = 42, Mean = 30.14 Std. Dev. = 4.28). Social Science-based students, (N = 62, Mean = 31.58 Std. Dev. = 3.86) while Arts courses-based students (N=96, Mean = 27.98 Std. Dev.= 5.01). Total respondents (N = 200, Mean = 29.55 Std.Dev. = 4.78).

Table 8: Difference in Mean Score in Acceptability of the CBT by Subject Areas

| | Sum of Squares | df | Mean Square | F | Sig.(<i>p-value</i>) |
|----------------|----------------|-----|-------------|--------|------------------------|
| Between Groups | 507.302 | 2 | 253.651 | 12.350 | .000 |
| Within Groups | 4046.198 | 197 | 20.539 | | |
| Total | 4553.500 | 199 | | | |

Table 8 contains the ANOVA result of the significant difference in Mean Score in acceptability of the CBT by Subject Areas. From the table the *F-value* is = 12.350 and a *p-value* < .05, therefore the null hypothesis is rejected; hence there is a real difference in the level of acceptability of the CBT among undergraduates in various course areas. The post-hoc test of multiple comparisons becomes necessary, to ascertain where the difference lies.

Table 9: Post-Hoc Test of Multiple Comparisons

| (I) Area | (J) Area | Mean Difference (I-J) | Std. Error | Sig. (<i>p-value</i>) |
|-----------------|-----------------|-----------------------|------------|----------------------------|
| Sciences | Social Sciences | -1.43779 | .90570 | .114 |
| | Arts | 2.16369* | .83844 | .011 |
| Social Sciences | Arts | 3.60148* | .73839 | .000 |

From data contained in Table 9, Undergraduates in the science-based discipline are not statistically different in mean score in terms of acceptability of the CBT from the social science-based student, but they differ when compared with the arts-based students. In the same vein the social science-based students, also differ when compared with the arts-based students.

DISCUSSION OF FINDINGS

The results presented above focus on the need for the adoption of CBT in testing at the undergraduate level. Empirical data supported the idea that the students have a positive attitude towards CBT. This finding is quite in agreement with the findings of (Udem and Dime, 2020; Saliu, *et al.*, 2020). These researchers studied the attitude of Nigerian students across different academic institutions of learning also, which is in agreement with the findings of Yu and Iwashita, (2021) for the Chinese while Mohamad and Mostafa, (2014) for the Iranian undergraduates, though Mohamad and Mostafa, (2014) reported that the students performed better in the paper and pencil test, this may not be far from the fact that the skill and ease of using the CBT by the students may still be at the developmental stage. There appears to be a high level of consistency in research findings in favor of the attitudinal disposition of students for CBT contrary to that of Sulaiman *et al.*, (2017) for the Ekiti State students, therefore, this means that the introduction of

CBT will be a step in the right direction given the associated benefits that could be derived from its use.

In terms of the acceptability of the CBT, the findings from this study revealed that the undergraduates of the university demonstrated a high level of acceptability. This finding is also in harmony with that of Okocha *et al.*, (2017) and Udem and Dime, (2020). The finding from this study has pointed to the fact that the level of acceptability of CBT by university students is high, therefore the introduction of CBT as the general mode of testing in undergraduate programs will be a welcome development and this could provide a win-win situation for the students and university management in the sense that students will benefit from the technology-driven process, fast result processing, accurate reporting while management will be more effective and efficient the testing and reporting of assessment outcomes.

Other findings from this study were that there are no gender differences in undergraduates' attitudes towards and acceptability of CBT, the finding is in agreement with the findings of Salihu *et al.*, (2020) and Aletan *et al.*, (2022) but not that of Olushola *et al.*, (2018); for acceptability, the study disagreed with Okocha *et al.*, (2017) who reported sex difference in acceptability of the CBT. The findings from this study can be seen from the perspective of the general equality that the society is promoting for both the boy and the girl child, there appears to be a closing of that gender gap. Research is beginning to show the absence of gender differences in terms of accessibility to education and educational materials as well as technological inclusiveness. The females are "coming out" and are getting themselves acquainted with the technological space, even in education.

Other findings are differences in attitude towards and acceptability of CBT by undergraduates in their different course areas or disciplines. Their attitude did not differ irrespective of the discipline the students are sciences, social sciences, or arts-based disciplines. However, that was not the case with their levels of the acceptability of the CBT. Undergraduates in the science and social-based disciplines tend to be on the same level but not so with undergraduates in the arts-based disciplines. This finding could be pointing to the fact that art-based disciplines are more of the performing and artistic presentation this could explain why even if they are favorably disposed to the CBT because of the peculiar nature of their study they are not ready to embrace the use of the CBT as a mode of testing them in all their courses, therefore the resistance in the adoption of the CBT.

CONCLUSIONS

Haven presented the report and discussion, the researchers concluded that undergraduates of the University of Benin have a positive attitude towards the adoption of CBT as the general mode of testing in the undergraduate programs and also their level of acceptability of the CBT is high. There are no gender and course area differences in attitude towards the CBT. Also, there is no gender difference in the acceptability of the CBT; however, there is a course area difference in acceptability.

RECOMMENDATIONS

Based on empirical evidence from this study, the researchers wish to recommend as follows:

1. The management of the university should consider the introduction of the CBT for all undergraduate examinations in the university
2. In a course or program where the adoption is not practicable such should be excluded from the general use
3. There should be an upgrade of available CBT facilities and equipment, training, and retraining of technical staff for the eventual take-off of the university-wide adoption of the CBT to enhance success.

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