CHAPTER ONE

INTRODUCTION

Background to the Study

Assessment is a fundamental activity in the learning process because it is not only used in obtaining information on learners' knowledge, understanding, abilities and skills but also it can be used to determine the learning outcome itself, advancing the learning procedure through appropriate feedback mechanisms. Assessment is central to the practice of education. For students, good performance on assessment gives access to further educational opportunities and employment. For teachers and schools, it provides evidence of success as individuals and institutions. Assessment systems provide the ways to measure individual and institutional success, and so can have a profound driving influence on systems they were designed to serve (Jim & Sean, 2004).

Assessment has been defined by Nkwocha (2004) as the use of different instruments, strategies and sources to gather and record information about how much individual learners have developed in the three domains of learning at specific intervals while still under training. It is an essential stock-taking aspect of the teaching-learning activity for the determination of learning outcome; it is also the process of gathering as well as discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand, and can do with their knowledge as a result of their educational experiences (Huba & Freed cited by Office of Assessment Services, 2015). This makes it imperative that for effective feedback in the teaching-learning process to take place, learners must be assessed. Assessment of students' academic achievement can be done through the use of paper-and-pencil test delivery mode or computer-based test delivery mode.

Paper-and-Pencil Test (PPT) also known as pen-and-paper test is the predominant method of students' assessment in Nigeria. It is a method in which students are assessed using paper and pencil. PPT is a written form of exam (with pen or pencil and paper) as opposed to an exam taken electronically via computer. It is also the presentation of test questions and accepting responses from examinees by the use of paper and pencil method. Students read the assessment on paper and answer a given set of questions at the desired performance level using paper and a pencil (CTB/McGraw-Hill, 2011). Therefore, PPT generally refers to tests in which questions are presented on a paper, and test takers respond by writing.

PPT is most extensively used in psychological testing. It has some advantages which include its portability and can be used in any setting. This means that PPT can be used in a rural, semi-urban or urban area where there is electricity or no electricity as opposed to a test administered electronically. Additionally, there is nothing such as database crashes in PPT because the students' responses to the questions are made in writing and documented and therefore, could not be lost as compared to electronic tests. Also, PPT does not lead to equity issues in the sense that it can be administered to the students irrespective of their skills or background knowledge of computer. PPT sometimes makes it easier for testees to think and gives them a sense of purpose when writing tests (Best Answer, n.d).

Nevertheless, there are limitations of PPT as reported by Sanni and Mohammad (2015). The researchers noted extensively that PPT has imposed serious limitations to its effectiveness. According to them, PPT is characterized by various forms of examination malpractices such as bringing in unauthorized materials, writing on currency note and identity cards, spying of other candidates in examination hall, substitution of answer sheets and change of examination scores or grades. On the

same note, Alabi, Issa and Oyekunle (2012) asserted that PPT in external examinations has many problems such as tedious processes as the examination is conducted at various and distant centres simultaneously and marked manually; high risks of accidents during travels by both the staff involved and the prospective students for the paper examination; cost of conduct of the examination on the part of the examination bodies including honoraria for invigilators, coordinators, markers, collators and other allied staff; subjective scoring and plausible manipulation of results; late release of results, missing scripts and examination malpractices.

The threat of examination malpractices on the validity of examination has made some examination bodies to give excessive attention to checking examination malpractices even at the test development stage. For instance, Joint Admissions and Matriculation Board (JAMB) administers different question formats in which questions do not follow the same order. The alternatives under each question in a format do not also follow the same order. However, it seems that candidates too are not relenting in frustrating and voiding all efforts by these bodies (Olatoye cited by Sanni & Mohammad, 2015).

Apart from PPT, alternatively, assessment can be delivered through the use of modern computers as Computer-Based Test (CBT). This is one of the recent 'innovative' approaches in the field of education and assessment under the influence of modern technology. CBT which is also called Computer Based Assessment (CBA) or Web-Based Testing (WBT) or E-exam is a method of administering tests in which the responses are electronically recorded, or assessed, or both. Sorana-Daniela and Lorentz (2007) defined CBT as tests or assessments that are administered by computer in either stand-alone or dedicated network

form or by other technology devices linked to the internet or World Wide Web. Most CBT use multiple choice questions (MCQs). CBT can be administered on networked PC workstations, personal computers (PCs), laptops, and even hand-held devices such as smart phones and tablet computers, this shows that students can be assessed electronically using computer gadgets. CBT is increasingly being used for assessment of students' knowledge in many examinations in Nigeria (Fadeyi, Desalu, Ameen & Adeboye, 2010).

Generally, advantages of CBT have been extensively documented and demonstrated in several ways such as: CBT allows educators to collect data on students' testing strategies, intermediate progress, amount of time spent on each question, and thought processes, in addition to their final answers. This information is based on analyses of times and sequences in data records that track students' path through each task, their choices of which materials to access, and decisions about when to begin responding to items (Bridgeman, 2009; Buško, 2009; Csapó, Ainley, Bennett, Latour, & Law, 2010; Kozma, 2009; Martin, 2009; Thompson & Weiss, 2009; Tucker, 2009).

Furthermore, CBT provides several security advantages. Instead of storing testing materials at school sites for days before a test administration, tests can be sent over the internet at the last minute, reducing the possibility of questions being exposed prior to the test. In addition, item sequences can be randomly scrambled for each student. There will be no one specific set of test questions that can be copied and distributed (Al-Amri, 2009; Bridgeman, 2009; Buško, 2009; Moe, 2009; Thompson & Weiss, 2009).

The merits of CBT, according to Mulvany (2011) has made it to emerge as one of the recent "innovative" approaches to assessments, and examination bodies are moving from paper and pencil testing to the electronic format in order to eliminate paper materials and provide more timely feedback, cheaper and speedier test delivery. CBT has also been found to vastly expand testing possibilities beyond the limitations of PPT. It offers many new opportunities for innovation in educational assessment through rich new assessment tasks and potentially powerful scoring, reporting and real-time feedback mechanisms (Scalise & Gifford, 2006). The modern assessment method provides opportunities to measure complex form of knowledge and reasoning that is not possible to engage and assess through PPT (Bodmann & Robinson, 2004). Despite these advantages available in CBT, it does not mean that CBTs are intrinsically better than PPTs (John, Cynthia, Judith &Tim, 2002).

CBT has limitations or drawbacks which hinder the efforts to computerize test. For example, examinees need computer literacy in order to eliminate the mode effect on computer-based testing (Alderson, 2000). CBT may not be successfully administered without electricity especially in rural areas. Additionally, some of the students may get anxious when tests are presented on a computer. Open ended questions are not presented in computerized formats because these kinds of questions are usually scored by human, therefore, human interaction doesn't exist in CBT (Brown, 2003).

To keep trends with international best practices, CBT, despite its limitations is now gaining popularity because of benefits accruable from it. This has made some developed countries of the world to move from the traditional test delivery mode to CBT. Nigeria is not left out as some tertiary institutions have started using CBT to

conduct their Post Unified Tertiary Matriculation Examination (PUTME), while Joint Admission and Matriculation Board (JAMB), one of the examination bodies has introduced CBT in its Unified Tertiary Matriculation Examination (UTME). Similarly, NGscholars (2013) submitted that other examination bodies in the country such as West Africa Examination Council (WAEC) and National Examinations Council (NECO) are also planning to adopt CBT method of assessment. Also, some tertiary institutions in Nigeria are now using CBT for their internal examinations, for example, Nnamdi Azikiwe University has used CBT for two semesters now for General Studies (GS) examinations. This is because CBT provides powerful tools to meet the new challenges of designing and implementing assessments method that go beyond the PPT and facilitate to record a broader repertoire of cognitive skills and knowledge (Mubashrah, Tariq & Shami, 2012).

Research findings from observations are inconclusive to support the fact that there are no differences between the scores obtained via CBT or PPT (Alabi, Issa & Oyekunle, 2012). Many research works have been conducted to evaluate the comparability of CBT and PPT. Some studies revealed that there is a significant difference between the two testing modes on test scores (e.g. Scheuermann & Björnsson, 2009; Choi, Kim, & Boo, 2003), while other studies reported opposite or inconsistent results (Al-Amri, 2009). Also, research findings on the preference of CBT or PPT by various stakeholders in the field of education and other fields of study have been quite varied in the literature. This has been shown in a study by Lim, Ong, Wilder-Smith, and Seet (2006) on medical students' attitude towards CBT Vs PPT testing in Singapore, through an online survey. The findings showed that higher percentage of the students used in the study preferred CBT to PPT. In this same vein, Clariana and Wallace (2002) found out that CBT delivery impacted

positively on students' scores as compared to PPT. The study also found that the CBT group out-performed the PPT group. On the contrary, other studies (Dermo & Eyre, 2008; George, 2011) carried out on CBT and PPT have opposite submissions, the results showed that students believed the PPT enhanced their performance while CBT had a negative effect, and other varied results. All these above studies were done in oversea countries.

Much has also not been said in research reports about effects of CBT and PPT on test anxiety and academic achievement in Nigeria. Test anxiety is an intense fear of performing poorly on assessments. It is characterized by feelings of nervousness and discomfort paired with cognitive difficulties (Columbus, 2008). Akman-Yesilel (2012) submitted that anxiety is a term used for several disorders that cause nervousness, fear, apprehension and worrying. Test anxiety is explained to be a feeling of unease, being apprehensive or nervous as a result of fear of failing an examination. It results to high levels of stress and apprehension during testing/evaluative situations that significantly interfere with performance, emotional and behavioral well-being, and attitudes toward school (Cizek & Burg, 2006; Huberty, 2009).

Many researchers (Cassady, 2010; Cizek & Burg, 2006; Dorland, 2009; Heiman & Precel, 2003; Huberty, 2009) reported that test anxiety is associated with excessive perspiration, sweaty palms, unexplained headache or stomachache, nausea, shaking body parts, rapid heartbeat, dizziness and muscle tension. According to them, students who are test anxious make negative self-statements or comparison ("I'm not as smart as others"), they have pessimistic expectations ("I'm going to fail this test"). In educational setting, test anxiety is common where the demands from a testing situation can incite a fear of failure, threat to self-esteem and worry over

how the performance will be judged by others (Putwain, 2008). According to Harris and Coy (2003), one of the most threatening events that cause anxiety in students today is testing. Similarly, Segool (2009) observed that test anxiety affects students' test performance.

In support of the above submission, Hassanzadeh, Ebrahimi and Mahdinejad (2012) reported that student's level of test anxiety can cause his/her academic performance to suffer even more depending on the length of time he/she suffers from test anxiety. Students having high scores on measures of test anxiety tend to perform relatively poorly on achievement tests, when compared with moderate anxiety scorers. Students with moderate anxiety appear to become deeply involved in evaluative task but highly test anxious students do not. Highly anxious students seem to experience attention blocks, extreme concern with autonomic and emotional self-cues, and cognitive deficits such as misinterpretation of information. The highly test anxious student's attention and cognitive deficits are likely to interfere with both learning and responding in evaluative situations and result in lowered performance.

Corroborating the above, Cassady cited in Akinlele and Adeaga (2014) reported that between 25% and 40% of students experience test anxiety. This also significantly interferes with their performance, emotional and behavioural well-being, and attitudes toward school (Huberty, 2009). Usually, students with disabilities tend to have higher rates of test anxiety (Whitaker Sena, Lowe, & Lee, 2007; Woods, Parkinson, & Lewis, 2010). The female students have also been found to be more test anxious than their male counterparts (Cizek & Burg, 2006), although, other studies may have different submissions. The research reports of test mode effect on students' test anxiety are inconsistent.

This implies that there are conflicting reports about the effects of CBT and PPT on test anxiety. A few studies have examined the effects of CBT or PPT on students' test anxiety, results of these studies seem inconsistent, providing no support that CBTs or PPTs will induce more anxiety or impact performance levels positively (Cassady & Cridley, 2005; Stowell & Bennett, 2010). Some studies reported increased test anxiety amongst students unfamiliar with use of computer (Erle, Benjamin, Einar & Raymond, 2006).

Revuleta, Ximenez and Olea (2003); Schult and McIntosh (2004) reported no correlation between anxiety levels of students who take a PPT and those who take CBT. However, a study by Stowell and Bennett (2010) found some correlation between the two test types and anxiety. They found that students with high anxiety in the classroom had less anxiety when taking their exams online. Students with low classroom anxiety had more anxiety taking an on online exam. They also found the relationship between test performance and test anxiety was stronger for the classroom setting.

Research reports of the effect of demographic attributes on students' CBT and PPT performance are not consistent. For example, some studies indicated that gender was not related to performance difference between CBT and PPT (Alexander, Bartlett, Truell & Ouwenga, 2001; Clariana & Wallance, 2002), while other studies suggested that gender is associated with the test delivery mode (Gallagher, Bridgeman, & Calahan, 2002; Leeson, 2006), with male examinees benefiting from the CBT format more than female examinees who showed slightly poorer performance on CBTs. The opposite is the case of other studies' results which have shown a better performance and high regard to CBT by female students in the studies done by Ayo, et al. (2007), Bebetos and Antonio (2008) as well as Kadel

(2005). Contrary to the above findings, Florida Department of Education (2006); Paek (2005); Poggio et al. (2005); Sim and Horton (2005) found that, regardless of gender, students perform at similar levels when they take tests on computers versus on paper.

Male and female secondary school students' academic achievement in Economics has been observed to be poor. This is evident in a report of Osadebe (2014) that it is not uncommon that senior secondary school students perform poorly in SSCE Economics. Also, other studies by Smitter (2008); Ndupuechi (2009); Augustine (2010, 2013); Atanda and Jaiyeoba (2011); and Tahir (2012) had similar submissions that secondary school students' academic achievement in Economics is low. Corroborating this view, The Premium Times (August 10, 2015) reported that out of 1,593,442 candidates who sat for (WASSCE) May/June, 2015, only 616,370 candidates came out with five credits and above, including English language, Mathematics and Economics. In 2013, total candidates who obtained five credits in English language, Mathematics and Economics were 639,760, while in 2014, 529,425 candidates obtained five credits in English language, Mathematics and Economics.

The above situation is worrisome because, it has shown that the academic achievement of both male and female secondary school students in Economics is fluctuating. One may possibly feel that this continuous fluctuation of students' academic achievement is occasioned by the use of traditional test mode. An attempt to determine which of the test modes (PPT or CBT) can reduce secondary school students' test anxiety and enhance performance in Economics is of concern to the present study.

Statement of the Problem

The goal of every educational setting is to monitor students' academic achievement by using the best test mode for excellent achievement in schools. Presently, various developed countries across the globe are migrating from the traditional test mode toward the use of CBT to assess students' academic achievement. CBT is not just an alternative method for delivering examinations, it represents an important qualitative shift away from traditional assessment because of several benefits it offers. Nigeria as a country is not left out in this as various educational institutions and examination bodies are migrating from the use of PPT toward the use of CBT for assessment of secondary school students' academic achievement in various subjects.

Students' poor achievement in Economics over the years in Senior Secondary School Certificate Examinations (SSSCE) has attracted a lot of concern. Many researchers observed that secondary school students' academic achievement in Economics may be very low because of the poor teaching/assessment methods used in schools (See Appendices XVII-XIX, pages 181, 182 and 183 for WAEC statistics on students' achievement in Economics). The traditional assessment mode may also affect students' academic achievement and test anxiety as it plays a significant role in academic settings and may prevent some students from realizing their fullest academic potential. To this end, the researchers recommended that appropriate teaching and assessment methods need to be used in Economics to reduce students' test anxiety and guarantee better students' academic achievement.

The results of various studies have not provided an answer to whether CBT or PPT reduces or increases students' test anxiety as well as students' academic achievement. This may raise a question- which of these test modes (CBT or PPT)

can effectively impact students' test anxiety and academic achievement in a positive or desired direction? Based on the above scenario and the many still unanswered questions surrounding the comparability of CBT and PPT, this study therefore is to comparatively analyze academic achievement and test anxiety scores of secondary school students exposed to Computer-Based Test (CBT) with scores of those exposed to Paper-and-Pencil Test (PPT) in Economics.

Purpose of the Study

The purpose of this study is to compare academic achievement and test anxiety scores of secondary school students exposed to Computer-Based Test (CBT) and scores of those exposed to Paper-and-Pencil Test (PPT) in Economics. Specifically, the study sought to:

1. compare the mean achievement scores of students exposed to CBT and that of those exposed to PPT in Economics

2. compare the mean achievement scores of male and female students in Economics

3. compare the mean achievement scores of male and female students exposed to CBT in Economics

4. compare the mean achievement scores of male and female students exposed to PPT in Economics

5. ascertain if there is interaction effect between gender and test mode with respect to achievement

6. compare the mean test anxiety scores of students exposed to CBT and that of those exposed to PPT in Economics

7. compare the mean test anxiety scores of male and female students in Economics

8. compare the mean test anxiety scores of male and female students exposed to CBT in Economics

9. compare the mean test anxiety scores of male and female students exposed to PPT in Economics

10. ascertain if there is interaction effect between gender and test mode with respect to test anxiety

Significance of the Study

This study on the comparative analysis of academic achievement and test anxiety scores of secondary school students exposed to Computer-Based Test (CBT) and Paper-and-Pencil Test (PPT) in Economics will hopefully be of immense benefits to many stakeholders. Amongst them are students, educational institutions, examination bodies, evaluators, curriculum planners, society at large and researchers.

The findings of this study have helped to know how each of the test modes impacts on secondary school students' test anxiety and academic achievement in Economics. If one of the test modes impacts positively and such test mode is adopted and used in assessment of students' academic achievement, it may help to reduce students' test anxiety and better their future academic achievement in Economics.

Extensively, the findings of this study will enlighten various educational institutions and examinations bodies in Nigeria on the test mode which impacts positively on test anxiety and academic achievement of students. This knowledge will help them to decide the test mode for assessment of students' academic achievement in schools as well as in external exams.

Furthermore, the findings of this study should help the evaluators and curriculum planners to take a decision and make policies concerning the test mode to be used in assessment of secondary schools students' academic achievement especially in Economics. This knowledge will make them mandate various institutions and examination bodies to use such test mode which reduces students' test anxiety and improve their academic achievement.

The benefits accruable from this study will help the society at large since the purpose is to determine which of the test modes impacts positively on test anxiety and academic achievement of secondary school students in Economics. If the test mode is determined and used for assessment in secondary schools, it will increase students' academic achievement and make them contribute immensely to the societal growth and development. In this manner, the money invested in training of these students by their parents will be valuable in the society.

Finally, the result of this study will serve as a framework, baseline data and literature to any researcher who may wish to carry out a research on Computer-Based Test (CBT) and Paper-and-Pencil Test (PPT) as the study will provide empirical evidence on the best form of test mode. This empirical evidence will add to already existing literature on the comparative analysis of academic achievement and test anxiety scores of secondary school students exposed to Computer-Based Test (CBT) and Paper-and-Pencil Test (PPT) in Economics.

Scope of the Study

This study focused on the comparative analysis of academic achievement scores and test anxiety scores of secondary school students exposed to Computer-Based Test (CBT) and those exposed to Paper-and- Pencil Test (PPT) in Economics. The students in senior secondary II class (SS 2) that offered Economics in co-

educational schools were used in this study. The reason behind the selection of this school type was to ensure that males and female students were adequately included in the present study.

The study covered three units in SS 2 Economics scheme of work. The units were;

1. Theory of Demand
2. Theory of Supply
3. Theory of Cost

Research Questions

To carry out this study effectively, the following research questions guided the study:

1. What are the mean achievement scores of students exposed to CBT and that of those exposed to PPT in Economics?
2. What are the mean achievement scores of male and female students exposed to CBT in Economics?
3. What are the mean achievement scores of male and female students exposed to PPT in Economics?
4. What are the mean test anxiety scores of students exposed to CBT and that of those exposed to PPT in Economics?
5. What are the mean test anxiety scores of male and female students exposed to CBT in Economics?
6. What are the mean test anxiety scores of male and female students exposed to PPT in Economics?

Hypotheses

The following null hypotheses were tested at .05 alpha level in the present study:

1. The difference in the mean achievement scores of students exposed to CBT and that of those exposed to PPT in Economics is not significant

2. The difference in the mean achievement scores of male and female students in Economics is not significant

3. The difference in the mean achievement scores of male and female students exposed to CBT in Economics is not significant

4. The difference in the mean achievement scores of male and female students exposed to PPT in Economics is not significant

5. The interaction effect between gender and test mode with respect to achievement is not significant

6. The difference in the mean test anxiety scores of students exposed to CBT and those exposed to PPT in Economics is not significant

7. The difference in the mean test anxiety scores of male and female students in Economics is not significant

8. The difference in the mean test anxiety scores of male and female students exposed to CBT in Economics is not significant

9. The difference in the mean test anxiety scores of male and female students exposed to PPT in Economics is not significant

10. The interaction effect between gender and test mode with respect to test anxiety is not significant

CHAPTER TWO

REVIEW OF RELATED LITERATURE

In this chapter, previous literatures that are related to the present study are reviewed under the following sub-headings.

Conceptual Framework

Test

Paper and Pencil Test (PPT)

Computer Based Test (CBT)

Test Anxiety

Academic Achievement

Theoretical Framework

Classical Test Theory (CTT)

State Trait Theory of Anxiety

Goal Theory of Achievement

Theoretical Studies

Studies on Achievement in Relation to CBT and PPT

Studies on Test Anxiety in Relation to CBT and PPT

Studies on Gender and Achievement in Relation to CBT and PPT

Studies on Students' Academic Achievement in Economics

Basic Issues in Psychological Testing

The Empirical Studies

Studies on Effects of CBT and PPT on Achievement

Studies on Effects of CBT and PPT on Test Anxiety

Summary of Review of Related Literature

Conceptual Framework

Concept of test. Test as well as examinations at all stages of education have been considered an important and powerful tool for decision making in our competitive society, with students being evaluated with respect to their achievement, skills and abilities (Rana & Mahmood, 2010). Test has been defined as an assessment intended to measure the test-takers' knowledge, skill, aptitude, intelligence, physical fitness, or classification in many other topics. Test is a form of examination to reveal what an individual possesses of does not possess with respect to intelligence, personality, aptitude or achievement. In the words of Nworgu cited by Abanobi (2013), test consists of a set of uniform questions or tasks to which a student is to respond independently and the result of which can be treated in such a way as to provide comparison of the performance in different students. All the above definitions given imply that test is a standard set of questions to be answered. It could be regarded as an instrument for evaluating learning in schools. It is administered to the testee for determining the extent he has attained previously identified objectives. The objectives here may be cognitive achievement, attitude, interest, personality, social adjustment, or psycho-motor skills.

A test could be in essay or objective form, essay test is a test that does not have a single correct answer, testees are allowed to answer essay questions with sentences composed and organized by them. The quality of the responses in essay test is judged subjectively by those who are skilled or informed in the subject. On the other hand, objective test is a test in which every question is set in such a way as to have only one correct answer (where) the opinion of the examiner or maker is not required to judge the correctness of the answer. One example of an objective test is

multiple-choice tests which are tests usually with four to five plausible answer options from which testees are expected to recognize the correct answer. Multiple-choice test can be administered in either paper and pencil based format or computer based format which is of concern to the present study.

Concept of paper and pencil test (PPT). PPT refers to a general group of assessment tools in which candidates read questions and respond in writing. This includes test such as knowledge and ability test, inventories such as personality and interest inventories. PPT has been defined by Psychology Dictionary (2015) as a test wherein the problems or queries are penned, printed, or drawn and the answers are penned too. PPT can be used to assess job-related knowledge and ability or skill qualifications. The possible range of qualifications which can be assessed using PPT is quite broad. For example, such tests can assess anything from knowledge of office procedures to knowledge of federal legislation, and from the ability to follow directions to the ability to solve numerical problems. Because many candidates can be assessed at the same time with a PPT, such tests are an efficient method of assessment. PPT is available for traditional classroom situations, where computer access is limited or where a controlled testing environment is required (Public Commission of Canada, 2011). Therefore, PPT generally refers to tests in which questions are presented on a paper, and testees give the answers in writing.

The advantages of PPT include: its portability and can be used in any setting. This means that PPT can be used in a rural, semi-urban or urban area where there is electricity or no electricity as opposed to a test administered electronically. Additionally, there is nothing such as database crashes in PPT because the students' responses to the questions are made in writing and documented and

therefore, could not be lost as compared to electronic tests. Also, PPT does not lead to equity issues in the sense that it can be administered to the students irrespective of their skills or background knowledge of computer. PPT sometimes makes it easier for testees to think and gives them a sense of purpose when writing tests (Best Answer, n.d).

Nevertheless, PPT has various problems which has questions on its validity. This Osuji (2012) reported that PPT is characterized by a lot of fraudulent practices ranging from leakage of examination papers or leakage of questions to students before the examination, use of machineries of all sorts by candidates, bribe taking by examination officials, impersonation and use of unauthorized gadgets. In an attempt to emphasize on the problems of PPT, the researchers, Sanni and Mohammad (2015) noted that PPT has imposed serious limitations to its effectiveness. According to the authors, PPT is characterized by various forms of examination malpractices such as bringing in unauthorized materials, writing on currency note and identity cards, spying of other candidates in examination hall, substitution of answer sheets and change of examination scores or grades.

In the same manner on the problems of PPT, Alabi, Issa and Oyenkule (2012) reported that the PPT has presented many problems some of which are:
1. Tedious processes as the examination was conducted at various and distant centres simultaneously and marked manually.
2. High risks of accidents during travels by both the staff involved and the prospective students for the paper examination.
3. Cost of conduct of the examination including honoraria for invigilators, coordinators, markers collators and other allied staff.
4. Subjective scoring and plausible manipulation of results.

5. Late release of results and missing grades.

6. Bank draft method of payment by candidates riddled by fraud, loss of money, stress and trauma.

Other examination irregularities with PPT may include students conniving with supervisors and school authorities to cheat, body writing or tattoo in which students especially females write on hidden parts of their bodies. For a number of decades, PPT has been the predominant mode of testing in Nigerian secondary schools, but, recently, another mode of testing 'Computer-Based Test' (CBT) is gaining popularity across the globe.

   Concept of computer-based test (CBT). CBT also known as Computer-Based Assessment or e-exam is a method of administering tests in which the responses are electronically recorded, assessed, or both. It is commonly available for several admissions tests throughout the developed countries. CBT refers to tests or assessments that are administered by computers in either standalone or dedicated network, or by other technological devices linked to the internet or worldwide web, most of them using multiple choice questions (MCQ) (Sorana-Daniela & Lorentz, 2007). This method of testing is important because it can measure different skills or sets of knowledge in order to provide new and better information about individuals' abilities. Various institutions of learning receive CBT results more quickly than those from PPT, and they can make their testing decisions more quickly. Individuals can take CBT even with minimal or no previous computer experience; since, instructions provided in a basic computer tutorial before the test will provide the experience needed to take the test using a mouse. One may spend much time on the tutorial to ensure comfortability with the computer and with the test before the official timed examination.

CBT is now gaining popularity over the PPT across the globe because of the numerous advantages it offers. The advantages of CBT have extensively been documented in literature in the following ways:

    i.   CBT are capable of including more interactive and engaging question types, such as simulations, on-line experiments, and graphing, allowing for the measurement of skills not easily assessed by PPT. In addition, proponents of computerized tests argue that they are a better match with the way students are accustomed to learning (Bridgeman, 2009; Buško, 2009; Csapó, Ainley, Bennett, Latour, & Law, 2010; Kikis-Papadakis & Kollias, 2009; Kozma, 2009; Kyllonen, 2009; Lee, 2009; Martin, 2009; Scheuermann & Björnsson, 2009; Thompson & Weiss, 2009; Tucker, 2009).

    ii.   CBT can be adapted to individual students' ability levels. Computer-adaptive tests adjust item difficulty based on students' responses to previous items. Incorrect responses evoke less difficult items, while correct responses evoke increasingly difficult items. This results in a more refined profile of skill levels for each student (Education Commission of the States, 2010; Gamire & Pearson, 2006; Kozma, 2009; Moe, 2009; Scheuermann & Björnsson, 2009; van Lent, 2009).

    iii.   CBT allows educators to collect data on students' testing strategies, intermediate progress, amount of time spent on each question, and thought processes, in addition to their final answers. This information is based on analyses of times and sequences in data records that track students' path through each task, their choices of which materials to access, and decisions about when to begin responding to items

(Bridgeman, 2009; Buško, 2009; Csapó et al., 2010; Kozma, 2009; Martin, 2009; Thompson & Weiss, 2009; Tucker, 2009).

iv. CBT can be more easily designed to meet the needs of special populations, including students with disabilities and those from diverse linguistic backgrounds (Gamire & Pearson, 2006).

v.   Quicker scoring of tests provides timely feedback to inform future instruction (Bennett, 2003; Education Commission of the States, 2010; Gamire & Pearson, 2006; Kikis-Papadakis & Kollias, 2009; Kyllonen, 2009; van Lent, 2009; Paek, 2005; Peter, Bill & David, 2004; Puhan, Boughton & Kim, 2007; Test, Measurement & Research Services Bulletin, 2009).

vi. Computerized administrations result in greater standardization of test administrations. For example, computers manage test timing very accurately (Bridgeman, 2009).

vii. Additional educational tools can be made available on an item-specific basis. For example, dictionaries can be made available for certain questions and turned off for others; one part of a test might require a full scientific calculator while another part might require only a simple four-function calculator (Bridgeman, 2009).

viii. CBT provide several security advantages. Instead of storing testing materials at school sites for days before a test administration, tests can be sent over the Internet at the last minute, reducing the possibility of questions being exposed prior to the test. In addition, item sequences can be randomly scrambled for each student. When adaptive tests are used, students respond to different subsets of items so there is not one specific

set of test questions that can be copied and distributed (Bridgeman, 2009; Buško, 2009; Moe, 2009; Thompson & Weiss, 2009).

ix.   Electronic delivery is less expensive than printing and mailing large quantities of testing materials. In addition, errors found in test booklets or answer sheets can be quickly and easily corrected, instead of reprinting and reshipping testing materials at considerable expense (Bennett, 2003; Bridgeman, 2009; Choi & Tinkler, 2002; Van Lent, 2009).

x.   Upon completion of the test, answer sheets and test booklets do not have to be mailed back to a central location for scoring, eliminating the chance that materials will be lost or damaged (Bridgeman, 2009; Rabinowitz & Brandt, 2001).

xi.   CBT reduce the costs associated with entering, collecting, aggregating, verifying, and analyzing data (Buško, 2009; Kozma, 2009).

xii.   Computerized tests reduce teachers' assessment demands in the classroom. Staff time is reduced because there is no longer the need to process vast amounts of paper (Johnson & Green, 2004; Rabinowitz & Brandt, 2001).

xiii.   CBT significantly reduce the consumption of paper (Kikis-Papadakis & Kollias, 2009; Paek, 2005; Puhan et al., 2007).

xiv.   Most studies have reported that students prefer CBT over PPT. However, it should be noted that correlations between enjoyment of CBT and achievement have been found to be weak. In other words, students' preference for taking tests on computers doesn't necessarily translate into higher test scores (Education Commission of the States, 2010; Buško, 2009; Florida Department of Education, 2006; Higgins, Rusell &

Hoffmann, 2005; Lee, 2009; Martin, 2009; Paek, 2005; Wang & Shin, 2009).

However, the advantages available in CBT do not mean that CBTs are intrinsically better than PPTs (John, Cynthia, Judith & Tim, 2002). Efforts made to computerize tests have been hindered by a number of methodological and technological challenges. Disadvantages associated with CBT have been reported and demonstrated in the following ways:

i. Computer crashes are more difficult to resolve than broken pencils. There is the potential that an entire testing session, along with all students' responses, could be lost. Back-up procedures are essential, both in terms of storing student responses and having alternative means to administer the test (Education Commission of the States, 2010; Bridgeman, 2009; Rabinowitz & Brandt, 2001). Kyllonen (2009) stated: "Computers add an extra layer of complication, require extra reviews, advanced set-ups, and tryouts."

ii. There are significant start-up costs for CBT which include hardware, software, and network purchases, connectivity, item banking, staff training, and technical support (Bennett, 2003; Education Commission of the States, 2010; Gamire & Pearson, 2006; Kikis-Papadakis & Kollias, 2009; Kozma, 2009; Kyllonen, 2009; Lee, 2009).

iii. CBT can lead to equity issues if some students have more access to computers and greater computer literacy skills than others. Research suggests that students with more computer skills perform at higher levels on CBT than students with lower levels of computer skills (Csapó et al., 2010; Education Commission of the States, 2010; Gamire & Pearson,

2006; Paek, 2005; Poggio, Glasnapp, Yang & Poggio, 2005; Thompson & Weiss, 2009).

iv. Security concerns associated with CBT center around staggered administrations of the same assessment (Bennett, 2003; Kozma, 2009; van Lent, 2009). In addition, Rabinowitz and Brandt (2001) noted that "a simple push of a button could send 'secure' test forms literally around the world." They concluded that states need to create multiple forms of each test, which will require the development of much larger item banks than most states currently have available.

v. School computing facilities vary considerably and it is often difficult to ensure that students are provided with uniform testing environments. Equipment often varies from one school to the next and sometimes from one machine to the next within the same school. Variability in testing conditions and procedures, such as Internet connection speeds and hardware and software specifications, must be addressed (Csapó et al., 2010; Kikis-Papadakis & Kollias, 2009). Bennett (2003) suggested that equipment variations be controlled by establishing hardware and software standards, directly manipulating resolution and font characteristics through the test delivery software, and designing items so that they display adequately at the lowest likely resolution.

vi. When large numbers of students take an assessment simultaneously, issues of scale must be addressed, such as network and server congestion, fluctuations in speed, and possible disruptions in service (Kozma, 2009; Kyllonen, 2009; Thompson & Weiss, 2009).

vii. Many schools lack the technical support needed to keep computerized systems functioning properly and equipment running smoothly (Bennett, 2003; Buško, 2009; Education Commission of the States, 2010).

viii. Most schools don't have the capacity to test all students on computers in one session. Therefore, administration of computer-based assessments usually involves significant changes to existing teaching schedules, as well as room, student, and personnel assignments. States, districts, and schools must decide how many testing sessions are needed, how many and which students will test during each session, and the specific dates and times of the testing window (Buško, 2009; Kozma, 2009; van Lent, 2009; Rabinowitz & Brandt, 2001).

ix. Considerable numbers of staff need to be trained in the administration of computerized tests. Test administrators need knowledge related to loading and/or accessing files, ensuring uniform assessment conditions, disabling software features (such as grammar checker for a writing test), and storing and transmitting files (Buško, 2009; Kikis-Papadakis & Kollias, 2009; Lee, 2009). Rabinowitz & Brandt (2001) noted that states must not underestimate the amount of staff training that is required in the early years of new programs.

x. Scoring interactive design problems with open-ended responses is much more difficult than developing an answer key for multiple-choice questions (Bridgeman, 2009).

Based on above, one may argue rightly that despite the merits of CBT, it does not mean that it is better than PPT in all sense i.e neither of the two modes of testing can be said to better than the other.

Concept of test anxiety. Anxiety is commonly referred to as an unpleasant emotional state characterized by excessive degrees of fear, worry and apprehension without a specific object or cause (Putwain, 2008). To Passer and Smith (2007), it is the state of tension and apprehension that is a response to perceived threat. In line with the above, Sarason and Sarason (2009) defined it as a diffuse, vague, very unpleasant feeling of fear and apprehension. It is initiated by internal feelings, as a response to a perceived threat. From the foregoing, anxiety is a feeling of uneasiness or nervousness brought about by evaluative or testing situation. Anxiety is a natural phenomenon which has been experienced by everyone. It is a state of uneasiness in response to a perceived threatening situation. It is a powerful physical experience that may involve rapid or pounding heartbeat, difficult breathing, tremulousness, sweating, dry mouth, tightness in the chest, sweating palms, dizziness, weakness, nausea, diarrhea, cramps, insomnia, fatigue, headache, loss of appetite, sexual disturbance, hypervigilance, difficulty in concentration, tension, feeling fainting, tired and frequent urination (Sarason & Sarason, 2009; Vasudevan, 2010). These symptoms may easily be mistaken for physical illness.

It also results in an inability to attend to more than one task at a time or to organize thoughts and plans effectively. Low levels of anxiety may temporarily increase a person's ability to do a simple task, because of greater vigilance and narrowing of attention associated with anxiety, but as anxiety increases, behavior becomes more disorganized and ineffective (Vasudevan, 2010). It creates an emotional imbalance, an anxious person worries a lot particularly about unknown danger. This led Ogu, Agbanusi and Umeasiegbu (2008) to conclude that anxiety encompasses distress and is often narrowly defined in terms of the competitive stress response, that is, the response of an individual to the prospect of

competition. Anxiety can be both a cause and effect of school failure – students do poorly because they are anxious, and their poor performance increases their anxiety.

It can equally be a state and a trait, some students tend to be anxious in many situations (trait anxiety), but some situations are especially anxiety provoking (state anxiety) (Convington; Zeidner in Woolfolk, 2007). Ogu, Agbanusi and Umeasiegbu (2008) see state anxiety as an immediate emotional state characterized by apprehension, fear and tension and involves acute feelings of the aforementioned. While trait anxiety is seen as a predisposition to perceived certain environmental situation with increased state anxiety, they further stated that trait anxiety is the base level of anxiety against which environmental threats make their mark, hence an individual with high trait anxiety will be more likely to look upon a great number of situations as threatening and will be more prone to go critical in stressful situations.

An individual exhibiting anxiety can make some self-descriptions indicating anxiety as reported by Sarason and Sarason (as cited in Nwosu, 2012 p.37);
i. "I am often bothered by the thumping of my heart".
ii. "Little annoyances get on my nerves and irritate me".
iii. "I often suddenly become scared for no good reason"
iv. "It is always hard for me to make up my mind".
v. "I always seem to be dreading something".
vi. "I feel nervous and high-strung all the time".
vii. "I often feel I can't overcome my difficulties".
viii. "I feel constantly under strain"

Anxiety responses have four components:

a. Subjective emotional component which includes feelings of tension and apprehension

b. Cognitive component which includes worrisome thoughts and a sens of inability to cope

c. Physiological responses including increased heart rate and blood pressure, muscle tension, rapid breathing, nausea, mouth diarrhea, and frequent urination; and

d. Behavioural responses, such as avoidance of certain situation and impaired task performance (Passer & Smith, 2007).

Woolfolk (2007) has stressed the fact that anxiety interferes with learning and test performance at three points: focusing attention, learning and testing. High anxious students find it difficult to pay attention to the material they are learning; instead they are preoccupied with how worried they are. This makes them develop poor study habits and they miss much of the information they are supposed to learn. Besides, anxious students often know more than they can demonstrate on a test. They lack critical test-taking skills, or they may have learned the materials but "freeze and forget" test. This accounts for the reason why many low achieving students continue to perform poorly on tests. One of the most threatening events that cause anxiety in students today is testing.

Test anxiety is considered a special case of anxiety that occurs in an assessment context or evaluative situation. It is considered to be a multi-dimensional construct that consists of two major factors: a cognitive dimension and an emotionality dimension. The cognitive dimension refers to the mental activity that revolves around the testing situation and encompasses worry and irrelevant thinking or

negative thoughts coupled with emotional discomfort. The emotionality dimension refers to the physiological component that includes tension, bodily reaction, and perceived arousal (Cassady, 2004; Zeidner, 2007). Zeidner in Nicole (2013) defined test anxiety as a set of phenomelogical, physiological, and behavioral responses that accompany concern about negative consequences or failure in an evaluative situation.

In educational settings test anxiety is common, where the demands from a testing situation can incite a fear of failure, threat to self-esteem and worry over how the performance will be judged by others (Putwain, 2008). Test anxiety largely depends on the extent to which students perceive assessments as threatening, and both personal and environmental characteristics can influence the onset (Putwain & Daniels, 2010). It occurs when one develops an extreme fear of performing poorly on examination. It is usually regarded as a particular kind of general anxiety. The person experiencing test anxiety often has a fear of failure as well as a high need to succeed. Both the fear of failure and the drive for success may be internalized. In some instances, either may seem more of a desire on the part of the test-taker to please a parent or other significant individual.

Test anxiety like general anxiety has three major components: cognitive, affective and behavioural components (Harris & Coy, 2003). From the cognitive perspective test anxious students are worriers lacking self confidence. They are preoccupied with negative thoughts, doubting their academic ability and intellectual competence. Furthermore, they are more likely to over-emphasize the potential negative results and feel helpless when in testing situation. Some students may feel the need to answer every question on the test correctly. When this does not occur, they may think of themselves as being incompetent, thus feeling of negative

thought such as, "I know I was not going to pass this test", "I know I am going to make a poor grade", or "everyone knows I am not smart".

Affectively, test anxiety causes some students to experience psychological reactions such as increased heartbeat, feeling nauseated, frequent urination, increased perspiration, cold hands, dry mouth and muscle spasms. These reactions may be present, during and even after the test is completed. When students are not able to control their emotions, they may experience higher levels of stress, thereby making it more difficult for them to concentrate. Behaviourally, test anxious students procrastinate and have ineffective study and test-taking skills. Test-anxious students have more difficult time interpreting information and organizing its lager patterns of meaning. Test anxiety regardless of the originating causes can be debilitating state of arousal. It has led to stress, poor academic performance and frustration (Harris & Coy, 2003; Reynolds & Fletcher – Janzen, 2002; Woolfolk, 2007).

When students believe the evaluative situation taxes or exceeds their intellectual, motivational, and social capacities, test anxiety is elicited (Putwain, Woods, & Symes, 2010). Skinner, Furrer, Marhcund and Kindermann (2008) reported that test anxiety is strongly related to perceived control, where students low in perceived control are more at risk for escalating anxiety. In addition, the effort applied by a child is associated to his or her perceived ability of achieving success and control; this means students with high test anxiety would apply little effort when their perception of success on the test and control over the situation is low. In addition, children suffering from test anxiety are more sensitive to failure and feelings of judgment (Hill & Wigfield in Nicole, 2013). It has been observed that test anxiety affects students' achievement in school; this is why the present study

focused to determine whether CBT or PPT reduces test anxiety level of secondary school students in Economics.

Concept of academic achievement. Academic achievement has become an educational touchstone since the passage of the federal No Child Left Behind Act in 2001, requiring all educators - including school counselors - to formally define how their jobs and programs impact students' academic growth and contribute to overall school success. The definition of academic achievement, however, varies among educators, policymakers and other educational stakeholders. Academic achievement or (academic) performance is the outcome of education, the extent to which a student, teacher or institution has achieved their educational goals.

It is expedient in education that great importance is attached to academic achievement due to the fact that it is one of the major goals of the educational process and also plays a significant role in quality assurance in the educational system and society at large (Ali, Jussof, Ali, Mokhtar, Syafena & Salamat, 2009; Calaguas, 2011; Nunathap, 2007). Rivkin, Hanushek and Kain (2005) explain academic achievement at any point in time as the cumulative function of current and prior school, community and family experiences. Academic achievement transcends mere academic performance to obtain grades; it entails a continuum of successes academically, including the ability for one to fend for oneself after school, using the skills and abilities acquired, not just the grades (Schofield, 2006; Stringfield, Reynolds & Schaffer, 2008). Academic achievement is commonly measured by examinations or continuous assessment but there is no general agreement on how it is best tested. It is based on this concern that the present study is geared to ascertain which of the test modes (CBT or PPT) can impacts positively on students' academic achievement in Economics.

Theoretical Framework

The present research has reviewed some theories that are relevant to this study under the following:

Classical test theory (CTT). Classical test theory (CTT) is a body of related psychometric theory that predicts outcomes of psychological testing such as the difficulty of items or the ability of test-takers. Generally speaking, the aim of CTT is to understand and improve the reliability of psychological tests. CTT may be regarded as roughly synonymous with true score theory. The term "Classical" refers not only to the chronology of these models but also contrasts with the more recent psychometric theories, generally referred to collectively as Item Response Theory, which sometimes bear the appellation "modern" as in "modern latent trait theory". In the words of Novick in Abanobi (2013), CTT assumes that each person has a true score, 'T' that would be obtained if there were no errors in measurement. A person's true score is defined as the expected number-correct score over an infinite number of independent administrations of the test. Unfortunately, test users never observe a person's true score, only an observed score, 'X'. It is assumed that observed score (X) is equal to true score (T) and some error (E).

$$X = T + E$$

Where X = observed score, T = true score and E = error

CTT is concerned with the relationship between the three variables X, T, and E in the population. These relations are used to say something about the quality of test scores and some of things that affects test score in the psychometric properties of the test items. Schumacker (2005) states the following assumptions of CTT which include;

a) True score and error scores are uncorrelated.

b) The average error score in the population is zero and

c) Error scores on parallel tests are uncorrelated.

CTT's major focus is on test-level information; item statistics (i.e. item difficulty and item discrimination). At the item level, CTT is relatively simple, since there are no complex theoretical models to relate an examinee's ability or success on a particular item. The proportion of a well-defined group of examinees, that answers an item correctly (empirically examined) - the p-value - is used as the index for the item difficulty (actually it is an inverse indicator of difficulty, since higher values indicate easier items). The ability of an item to discriminate between high ability examinees and low ability examinees is expressed statistically as the correlation coefficient between the scores on the item and the scores on the total test.

CTT models according to Schumacker are often referred to as "weak" models, because the assumptions of these models are easily met by test data. There are, however, some shortcomings with CTT, one shortcoming is that item difficulty and item discrimination indices are group dependent; the values of these indices depend on the group of examinees in which they have been obtained. Another shortcoming is that observed and true test scores are dependent. Observed and true scores rise and fall with changes in test difficulty. Another shortcoming has to do with the assumption of equal errors of measurement for all examinees. The ability estimates are in fact less precise both for low and for high ability students than for students of average ability. The present study relates to this CTT theory because it is based on Economics Achievement Test (EAT) and established the validity indices of the EAT for the CBT and PPT which required computation of difficulty index, discrimination index and distracter index of the items.

State trait theory of anxiety. State Trait Anxiety Theory sees anxiety from the typology of state and trait anxiety. It explains anxiety as consisting of a condition brought about by a response to perceived threat or challenge, and this condition being dependent on an individual psychological make-up. Spielberger in Lawson (2006) pointed out that state anxiety is a transitory emotional state or condition of human organism that varies in intensity and fluctuates over time. It is characterized by subjective, consciously perceived feelings of tension and apprehension, and activation of the autonomic nervous system. Ogu, Agbanusi and Umeasigbu (2008) refer to state anxiety as a temporary condition which is produced in response to the immediate perception of threat or challenge.

In a testing situation, state anxiety is conceptualized as a situation specific form of test anxiety that encompasses both worry and emotionality (Lawson, 2006). It is characterized as an emotional state that a student may experience during an evaluation situation (Hong & Kartensson, 2002 in Lawson, 2006). Lawson (2006) further stated that the emotional state fluctuates depending on the extent of the students perceived threat created by factors such as how well prepared the student was for the examination, the type of test questions, difficulty level of the test questions, and individual differences in personality characteristics.

Trait anxiety is a relatively stable individual difference in anxiety proneness, that is, to differences in disposition to perceive a wide range of stimulus situations as dangerous or threatening, and in the tendency to respond to such threats with state reaction. It also reflects individual differences in the frequency and the intensity with which state (anxiety) has been manifested in the past, and in the possibility that such states will be experienced. In test situations, students who

score high on trait anxiety are likely to interpret the examination situation as being more threatening compared to students who scored lower on trait anxiety (Lawson 2006). Thus, high trait anxious students are more likely to experience state anxiety of greater intensity and frequency (Zeidner in Lawson, 2006), greater physiological arousal, more worry cognitions and increased task irrelevant thoughts that distract the student's attention away from test performance   compared to low trait anxious students (Spielberger in Lawson 2006). This theory is very relevant in this study with fact that students are prone to either state or trait anxiety. This study is also geared to determine which of the test modes can reduce students' anxiety.

Goal theory of achievement. Good academic achievement is very important not only to students and their parents, but also to the learning institutions and the society at large. In every classroom environment, students are expected to achieve something at the end of an instruction and this lends credence to the need for proper articulation of instructional objectives. At the completion of a task some students achieve highly while some achieve poorly even when they have all it takes to be at par with their classmates. The goal theory of achievement accounts for this.

In Goal Theory of Achievement, Ames in Nwosu (2012) argued that the way in which classroom learning environments are structured (e.g, grading system, work assigned) influences how students think about themselves and their academic work and subsequently how (and to what extent) students attempt to learn. According to this theory, students can take either of two approaches as they attempt to define and to act on classroom achievement goals. These are referred to as mastering and performance goals. Central to a mastering goal orientation are

the students‟ belief that effort and outcome are related, a continuing commitment to learning, and a focus on the intrinsic value of learning.

In contrast, Good and Brophy in Nwosu (2012) stated that the foundation of a performance goal orientation is a focus on one's ability and self-worth. They went further to state that a mastering goal orientation is associated with a success-seeking pattern of classroom participation, whereas a performance goal orientation fosters a failure-avoiding pattern. The former are likely to spend more time learning and to persist longer on difficult tasks while the later are more likely to attend to surface characteristics of tasks ("How fast do I need to perform?") rather than to attempt to understand and integrate material (Good & Brophy in Nwosu, 2012). Performance goal oriented students achieve lower than mastering oriented students, not probably as a result of intelligent quotients but as a result of a pattern of motivation characterized by the use of superficial or short-term learning strategies and a focus on doing better than others (Ames in Nwosu, 2012). This theory is very much related to the present study because it is focused to determine the academic achievement of students based on the test mode.

Theoretical Studies

Theoretical studies on achievement, test anxiety as well as gender in relation to CBTs and PPTs have been reviewed extensively in the present study

Studies on achievement in relation to CBT and PPT. Many research works have been conducted to evaluate the comparability of computer-based test and paper and pencil test. Telia and Bashorun cited by Alabi, Issa and Oyekunle (2012) in a study whose results demonstrated that the University of Ilorin students, their respondents, have positive attitude towards CBT as more than half of them indicated preference for CBT over PPT in addition to

establishing a strong perception that CBT increase respondents' performance in learning. Lim, Ong, Wilder-Smith, and Seet (2006) examined medical students' attitude about CBT Vs PPT testing in Singapore. Through an online survey, 213 (53.5%) final-year MBBS students were tested, out of which 91 (79.8%) preferred CBT, 11 (9.6%) preferred PPT format and 12 (10.5%) were unsure. The study found that 42 liked CBT because of good quality of images and independent of assigned seating positions; 22 liked CBT because they could proceed at their own pace; one stated that CBT examinations was fun; 4 enjoyed the convenience of CBT and 6 cited "equality" as the reason they preferred CBT over PPT testing.

A study by Ayo, Akinyemi, Adebiyi and Ekong (2007) on Nigerian University stated that 81.3% of the applicants were computer literate, while the remaining 18.7% were guided through the examination. The total number 1023 (75.7%) of respondents who participated in the e-examination conducted in Covenant University took electronic examination for the first time and as such found the examination easy, a few found it a little challenging but adjusted with time. The study revealed that only 327 (24.2%) of the applicants had not been involved in any form of electronic examination before, and found it difficult.

On the contrary, other studies have been carried out on computer-mediated examinations, students' perceptions, students' attitude and performance, and found out that students believed the PPT enhanced their performance while CBT had a negative effect, and other varied results (Dermo & Eyre, 2008; George, 2011). Clariana and Wallace (2002) investigated to confirm several key factors in CBT versus PPT assessment. The study used a post-test only design with one factor, test mode (Computer-based and Paper-based). Students'

score on 100-item multiple choice items and students' self-report on a distance learning survey were treated as dependent variables. Results showed that CBT delivery impacted positively on students' scores as compared to PPT. The study found that the CBT group out-performed the PPT group. Gender, competiveness, and computer familiarity were not related to this performance difference, though content familiarity was.

Computer familiarity was examined as another important factor that may have an impact on students CBT performance, but the results were not consistent. Some studies suggest that computer familiarity was not related to performance difference between CBT and PPT groups (Clariana & Wallance, 2002; Bennett, Braswell, Oranje, Sandene, Kaplan, & Yan, 2008). Little or no performance difference was shown associated with students' computer familiarity, suggesting that computer experience does not affect students' CBT scores (Edit; Taylor, Kirsch, Eignor, & Jamieson in Robert, Hong, Chao, Ming & Yoon, nd; Leeson, 2006). On the other hand, other studies reported the opposite findings. For example, Goldberg and Pedulla (2002) found that students' computer familiarity was significantly associated with test performance in CBTs. Students with lower computer familiarity scored lower on CBTs than students with moderate and higher computer familiarity.

Many studies Chuah, Drasgow and Roberts (2006) as well as Gosling, Vazire, Srivastava and John (2004) found significant differences between computer-administered testing and traditional paper and pencil testing. These studies and articles attributed achievement differences to several factors. Karadeniz (2009) studied the impact of paper based, web based and mobile based assessment on students' achievement. A group of 38 students was experimented for 3 weeks. Significant differences were found between the scores achieved by the students in

second week, but not in the first week. The authors perceived that students had positive attitude towards web based, mobile-based assessment due to ease of use, comprehensive, and instant feedback. Moreover, most favored tests were web-based and the least favored were paper-based.

In another experimental research, Bodmann and Robinson (2004) conducted an experimental study to compare speed and performances differences between CBTs and PPTs. Both CBTs and PPTs contained 30 MCQs items with 35 minute of time limit. Approximately half the class (i.e. 28 students) took the first test on the computer and the rest preferred first test on paper. Procedures shifted for the second tests, with the first group receiving PPTs and second group received CBTs after two weeks. It was concluded that undergraduates completed the CBT faster than PBT with no difference in scores.

Some studies revealed that there is a significant difference between the two testing modes on test scores (e.g. Scheuermann & Björnsson, 2009; Choi, Kim, & Boo, 2003), while other studies reported opposite or inconsistent results (e.g. Al-Amri, 2009). Other interesting findings include the effect of higher-attaining students, students with learning disabilities, and the time factor that impact students' CBT performance. For example, Clariana and Wallance (2002) found higher-attaining students benefited most from CBTs relative to higher-attaining students under PPTs. Similarly, Leeson (2006) found that high-ability students' performance appeared to be advantaged by CBT. In a study by Schmiddt, Ralph, and Buskirk (2009), it was indicated that the online exams provided an opportunity for students to complete the exam at a time that was best for them. In terms of the relationship between test mode and students with learning disabilities, Dolan, Hall, Banerjee, Chun and Strangman (2005) found a significant increase in

scores on the CBTs versus PPTs administration for high school students with learning disabilities.

Several researchers have noted that the replacement of PPTs with CBTs introduces equity issues into the testing situation. In the U.S., for example, surveys conducted for Pew Research Center's Internet & American Life Project in 2009 found that only 35 percent of low-income Americans (household income reported at $20,000 or less) stated that they had broadband connections, while 85 percent of upper-income Americans (household incomes reported at over $75,000) stated that they had access to these services (Horrigan, 2009). It is therefore possible that higher-income students have more familiarity and experience with computers.

Studies indicate that students with more computer skills receive higher scores on computer-based tests than students with fewer computer skills. Conversely, students with fewer computer skills and those who don't use computers on a regular basis have been found to perform better on paper-and pencil tests (Bridgeman, 2009; Csapó et al., 2010; Education Commission of the States, 2010; Gamire & Pearson, 2006; Kyllonen, 2009; Paek, 2005; Poggio et al., 2005). Researchers have concluded, therefore, that computer-based assessments may place an unfair disadvantage on certain subgroups of learners who don't have as much opportunity to practice on the computer and become familiar with testing conditions (Kikis-Papadakis & Kollias, 2009; Rabinowitz & Brandt, 2001).

Bennett et al (2008) analyzed results from the National Assessment of Educational Progress' 2001 Math Online (MOL) study. A nationally representative sample of eighth grade students was administered a computer-based math test and a test of computer facility (measuring computer experience, input accuracy, and input speed). In addition, a comparison group of students was administered a paper-and-

pencil test containing the same math items. Students were randomly assigned to testing conditions. Results showed that students with greater input speed and accuracy received higher MOL scores.

The researchers concluded that some students may have received higher scores than their equally mathematically proficient peers simply because of their more advanced computer skills. Horkay et al (2005) reported that sample of eighth grade students participating in the National Assessment of Educational Progress' Writing Online (WOL) study showed that students reporting more computer familiarity scored higher on the computer-based test than those reporting less computer familiarity. Computer familiarity added about 11 percentage points over PPT writing scores to the prediction of performance.

A few studies have found no evidence that students with less computer experience score lower on computer-based assessments (Florida Department of Education, 2006; Paek, 2005; Wang & Shin, 2009). Higgins, Russell, and Hoffmann (2005) comparison of Vermont students randomly assigned to complete a reading comprehension test on CBT or PPT found no significant differences in test scores based on students' self-reported levels of computer fluidity (ability to use the mouse and keyboard) or computer literacy (familiarity with computing terms and functionality). However, they found that students with lower computer fluidity and/or literacy tended to receive the lowest scores.

Overall, research on the comparability of computerized and paper-and-pencil assessments suggests that mode of administration has very little effect on students' performance (Bennett et al., 2008; Horkay et al., 2005; Moe, 2009; Schroeders, 2009; Sórenson & Andersen, 2009; Wang et al., 2007; Poggio et al., 2005). Paek's (2005) summary of comparability studies found that out of 97 cases, the results of

computer-based and paper-and-pencil tests were comparable in 74 cases; in eight cases, the computer-based test appeared to be more difficult; and in 15 cases, the paper-and-pencil test appeared to be more difficult. The Texas Education Agency (2008) noted, however, that even a small effect can have significant consequences.

For example, the Agency pointed out that a mode difference of even one point on a test can result in a substantial number of students not passing because they took the test in a different mode. Several studies have also found that even when overall test score differences between the two modes of administration are not significant, certain items may be more affected by mode of administration than others (Choi & Tinkler, 2002; Johnson & Green, 2004; Kim & Huynh, 2007; Higgins et al., 2005). The following sections of this report review research conducted to determine if the mode in which students take a test has an impact on their performance, in general, most experts suggest that the more complicated it is to present or take a test on a computer, the greater the possibility of mode effects. Scores obtained from computer-based and paper-and pencil tests have been found to be equivalent when the computer-based test is constructed to look similar to the paper-and-pencil version of the test (Poggio et al., 2005; Pommerich, 2004; Russell et al, 2003).

Similarly, Higgins, Russell, and Hoffmann (2005) examined the test scores of fourth grade students who were randomly assigned to complete the same computer-based reading comprehension test in one of three modes: on paper; on computer with scrolling reading passages; or on computer with passages divided into sections that were presented as whole pages of text. They found that students completing the test on paper received the highest mean score, followed by the whole page group, and then by the scrolling group, although there were no significant differences among the scores of the three groups. The researchers

concluded: "Overall, students were neither advantaged nor disadvantaged by the mode of test delivery."

Some studies reported basic features available to students during paper-and-pencil tests that are not always available to students taking tests on computers which include the ability to skip items and answer them later in the test; the ability to review items already answered; and the ability to change answers to items (Johnson & Green, 2006; Russell et al., 2003). Johnson and Green (2006) concluded that students taking the test in paper-and-pencil format "possessed a degree of independence and control on paper that allowed them access to strategies that could facilitate their performance."

On the other hand, Pommerich (2004) conducted two comparability studies on a sample of eleventh and twelfth grade students in 40 schools. She concluded that students were sensitive to how test items were presented. For example, students taking computer-based tests were better able to focus on some items because relevant sections of those items were centered in item windows and students were not distracted by extraneous information. However, Pommerich hypothesized that students taking paper-and-pencil tests were more likely to experience "positional memory," whereby they remembered the location of information given in the passage, based on its spatial location both on the page and within the document.

In contrast, some students taking computer-based tests had difficulty locating information in passages because scrolling allowed only relative spatial orientation. Some students testing on computers also had difficulty comparing information across tables or figures that did not appear on screen simultaneously. Keng, McClarty, and Davis (2006) reported that the test mode effect was significantly larger for Texas Assessment of Knowledge and Skills English/language arts items

with long passages and for math items involving graphing and geometric manipulations that required more scrolling through the screen.

To this end, Educators need to ensure that a test presented on the computer measures the same knowledge and skills as its paper-and-pencil counterpart and those scores from computer-based test administrations should have the same meaning as scores from paper-and-pencil administrations. Test scores should be dependent on students' ability, not on the test administration mode. Furthermore, no student should be disadvantaged because of a change in test administration medium.

The Florida Department of Education (2006) stated: "Choosing between computer-administered and paper-administered tests would be easier if there were clear, incontrovertible evidence that for all students there is no difference in results whether a test is taken on computer or by printed test materials." Some studies suggest that students do not obtain the same results when they take an identical test on both computer and on paper. This finding is referred to as a "test mode effect."

The test mode effect is the observation that performance tests measuring similar knowledge and skills yield different results when they are administered on computers versus with paper and pencil. For state and national assessments, comparability across delivery modes is important because assessments are usually offered on both computer and paper, since most schools don't have the infrastructure and equipment to test all of their students by computer. In these cases, scores from the two modes should be interchangeable. Comparability is also important when there is a transition from paper-and-pencil to computer-based delivery and educators want to compare students' performance across time

(Bennett, 2003; Clariana & Wallace, 2002; Csapóet al., 2010; Texas Education Agency, 2008; Crusoe, 2005). From the foregoing, some studies found that test mode effect on achievement was not significant while other studies had opposite submission. This is why this study sets out to determine whether test mode has effect on achievement or not.

Studies on test anxiety in relation to CBT and PPT. Very little research is available on the effects of CBTs and PPTs on test anxiety. A study was conducted using junior high, high school, and college students. Eighth grade students in Wang and Chuang's (2002) research responded positively to CBT. Measures of anxiety, test preference, adaptability of the test, and acceptance of test results all showed students viewed the CBT with a positive attitude and positive preference. Likewise, research conducted by Fritz and Marzeck cited by Gwen (2013) comparing two groups of junior high students, one group taking a P&P test and one group taking a CBT version of the same test, found lower rates of self-reported state test anxiety in the group taking the CBT version than students taking the PPT version.

It was believed that socioeconomic differences between the two groups may have led to some of the differences, but the most likely explanation was that on a CBT, the questions match the student's ability more closely. Students may not feel as anxious because the questions are less likely to be too difficult, leading to frustration. By contrast, on a PPT, most students encounter items that are too difficult, which is likely to cause more anxiety. The majority of research in this area has been done at the college level. It is the general consensus that there is no correlation between anxiety levels of students who take a PPT and those who take a CBT (Revuleta, Ximenez & Olea, 2003; Schult & McIntosh, 2004). However, a

2010 study by Stowell and Bennett found some correlation between the two test types and anxiety. They found that students with high anxiety in the classroom had less anxiety when taking their exams online. Students with low classroom anxiety had more anxiety taking an on online exam. They also found the relationship between test performance and test anxiety was stronger for the classroom setting.

Research reports much success with computer-based instruction designed for students with learning disabilities. There is evidence that computer-based instruction in math, spelling, and reading can help improve these students' skills (Eden, Shamir & Fershtman, 2011; Seo & Woo 2010; Soonhwa, DaCosta, Kinsell, Poggio, & Meyen, 2010). Also, computer-based reading programs have been found effective in increasing certain basic early literacy skills of students at-risk for reading failure (Pindiprolu & Forbush, 2009). Because of the success of computer-based instruction with students with LDs and the increasing familiarity of today's students with computer technology educators must consider the use of CBTs as a viable way to decrease test anxiety among their students.

There has not been much research done on test anxiety, but few studies focus on test anxiety in elementary students with LDs and what can be done to reduce that anxiety. This study hypothesized that students with LDs will suffer from less test anxiety when asked to complete assessments via a computer compared to taking those same assessments via paper and pencil. A few studies have examined the relationship between CBTs and student test anxiety. Results from these studies seem inconsistent, providing no support that CBTs will induce additional anxiety or impact performance levels (Cassady & Gridley, 2005; Stowell & Bennett, 2010). Students' fear of computers or the tendency of the students to be uneasy, apprehensive and have phobia towards current or future use of computers in

general is called computer anxiety of the students. As computers emerged into the mainstream in the 1980's, it became apparent that many users experience anxiety in using this new technological device.

According to Aziz and Hassan (2012), an individual is considered computer anxious if the emotional state during interaction with computer reduces the benefits of the use of computers and discourages necessary use of computers. Computer anxiety obviously affects students' knowledge and performance in CBT. Some researchers have posited that inadequate knowledge of computer might increase the level of students' anxiety, which may invariably affect students' performance in CBT (Aziz & Hassan, 2012). Computer anxiety results from lack of examinees' experience in using computers and if they become more familiar with computer use, computer anxiety might be reduced.

Tekinarslan (2008) reported that there is no significant difference between male and female students' computer anxiety. Tekinarslan further reported that as students' computer knowledge increases, computer anxiety level of student's decreases. Many studies have also established the link between computer anxiety and performance in CBT. Findings from these studies also seem inconclusive. Some studies reported that computer anxiety was not statistically significant for performance in CBT British Journal of Education, Society & Behavioural Science, (Cassady & Gridley, 2005; Stowell & Bennett, 2010). Conversely, some studies reported that students who reported medium and high levels of computer anxiety perform worse than those with low levels in a CBT (Glaister, 2009).

Studies on gender and achievement in relation to CBT and PPT. The results of the effect of demographic attributes on students' CBT performance are not always consistent. For example, some studies indicate that gender was not related to performance differences between CBT and PPT (e.g., Alexander, Bartlett, Truell, & Ouwenga, 2001; Clariana & Wallance, 2002), while other studies suggest that gender is associated with the test mode (Gallagher, Bridgeman, & Cahalan, 2000; Leeson, 2006), with male examinees benefiting from the CBT format more than female examinees who showed slightly poorer performance on CBTs. In the same vein, Gaskell and Marshall (2007) found a significant difference in Numeracy multiple-choice assessment with students doing significantly better in the paper mode than the electronic (online) mode of the assessment. In this study the researchers reported "that the difference between paper and electronic modes was greater for males than females", but much of the gender difference is "attributed to some larger school having considerable gender differences".

The opposite is the case of other studies' results which have shown both positive attitude and high regard to CBT, with more positive perception by female students in the studies done by Ayo, et al. (2007), Bebetos and Antonio (2008) as well as Kadel (2005). Another separate study investigating the difference in performance between CBT and PPT in terms of gender, race and age, found no significant difference (Bennett, Braswell, Oranje, Sandene, Kaplan & Yan, 2008). Whereas, in some other studies, gender was related to performance difference between CBT and PPT (Gallagher, Bridgeman, Cahalan, 2002; Lesson, 2006) with male examinees benefitting from CBT format more than female examinees who scored slightly lower in CBTs. The rise in technology has seen the emergence of a social issue called the "digital divide". The digital divide refers to

individual or group inequalities in technological knowledge, accessibility, skill, self-efficacy and anxiety, these differences are often due to factors such as gender, age, race and socio-economic status.

Jones, Johnson-Yale, Millermaier and Perez (2009) as well as Cooper (2006) conducted a meta-analysis on the past 20 years of research studying gender differences and the digital divide. He found out that girls and women expressed greater anxiety and more negative attitudes toward computers than boys and men. According to Cooper (2006), girls learn from an early age that computers are an educational medium designed with boys in mind; this perception creates greater stress and anxiety whenever girls and women interact.

As a result of gender roles assigned by different cultures, many women have been brought up to see technology and its use as exclusively reserved for the male gender. Asuquo and Onasanya (2006) reported that women look at computers and see more than machines, thus considering computers as masculine and complicated to use. According to Munusamy (2009), many factors in and outside the classroom result in girls being turned away from computer technology. These factors include the media depicting men as experts in technology, societal expectations of different goals for boys and girls, the structure of learning tasks, the nature of feedback in performance situations and the organization of classroom sitting. Because these factors are often restrained, they go unnoticed. It is little wonder why boys are more knowledgeable in computer than girls.

Some studies have found that, regardless of gender, students perform at similar levels when they take tests on computers versus on paper (Florida Department of Education, 2006; Paek, 2005; Poggio et al., 2005; Sim & Horton, 2005). On the

other hand, a number of studies have found that boys outperform girls when tested on the computer, while girls perform significantly better on paper-and-pencil tests (Csapó et al., 2009; Halldórsson et al., 2009; Higgins et al., 2005; Lee, 2009; Martin & Binkley, 2009; Sórenson & Andersen, 2009). Researchers have hypothesized several reasons for this finding. Some suggest that although gender gaps in volume of computer usage have closed rapidly over the last few years, boys are much more likely to play online games and use game-type software that are similar to the flash animations and video footage used with many computer-based test items.

These activities expose boys more frequently to the content that appears in computerized tests. Others theorize that boys' higher performance on computerized tests may partially be explained by computer-based tests' lower reading load or a bias toward boys in the content of items included on computerized tests (Crusoe, 2005; Halldórsson et al., 2009; Martin & Binkley, 2009; Sórenson & Andersen, 2009;). Horkay et al (2005) used the National Assessment of Educational Progress' (NAEP) Writing Online (WOL) study to examine differences in students' performance on computer-based and paper and-pencil tests, based on their gender, ethnicity, parents' education level, income level (based on eligibility for free or reduced price lunch), and school location. WOL groups were composed of nationally representative groups of eighth grade students drawn from the main NAEP assessments. The researchers found no significant differences in either boys' or girls' performance on computer-based versus paper-and-pencil tests. The argument is whether gender has effect on test anxiety when assessed with any of the test modes which is what the present study is determined to find.

Studies on students' achievement in economics. Economics has been variously defined by different scholars. Economics is defined as a science of human welfare as well as a study of the method of allocating scarce resources (physical and human) among unlimited wants or competing needs. The most widely accepted definition, however, is that given by Lord Lionel Robbins in Augustine (2010) that Economics is the science which studies human behaviours as a relationship between ends and scarce means which have alternative uses. This definition is widely accepted because it better reflects the fundamental Economic problems of scarcity and choice than any other available known definition.

Augustine (2010) stated that Economics as a subject provides training for students on how to make rational use of scarce resources to satisfy their unlimited wants, to build up theories and tools for economic analysis; provides rational guide to firms and governments in allocating scarce resources; to understand and appreciate Economic problems facing the society and suggest ways of rectifying them; helps the planners to plan for Economic development; helps to solve the fundamental problem of what to produce, how to produce and for whom to produce; and to appreciate Government's economic policies among others.

Economics is useful because it prepares students to contribute positively to rapid economic development of the nation. Also enable students and individuals to spend wisely so that the little resources at their disposal can be used to maximize their satisfaction. Knowledge of Economics teaches the students how best to use available scare resources and enables them to make or take rational decision with regard to maximizing total satisfaction. Knowledge of Economics helps students to understand the overall operation of the economic system which put them in a better

position as (business executives) to formulate good policies that would ensure profit maximization for the organization".

Student's performance in Economics in Nigeria is not encouraging. There is a noticeable fluctuation in students' performance in economics in Senior Secondary Certificate Examination (SSCE). This is shown in the statistics below;
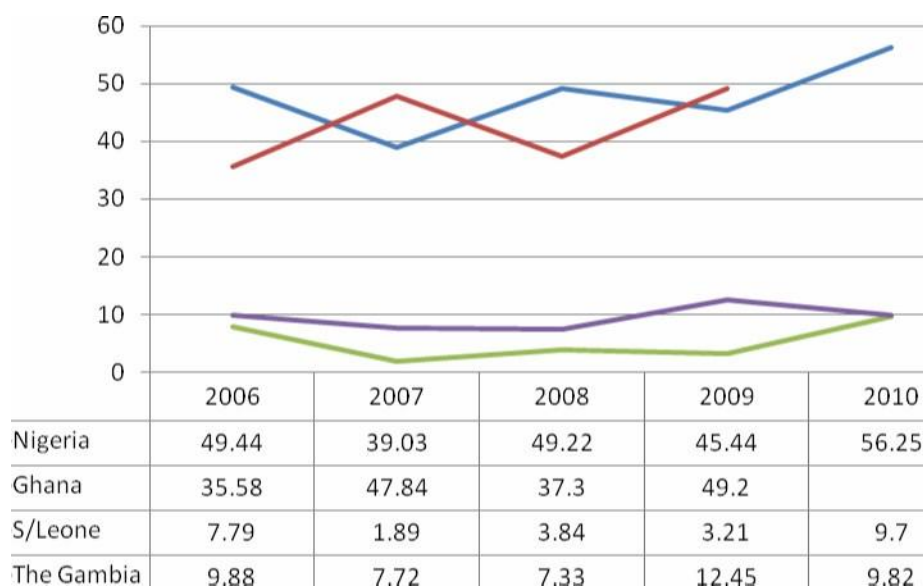
	2006	2007	2008	2009	2010
Nigeria	49.44	39.03	49.22	45.44	56.25
Ghana	35.58	47.84	37.3	49.2	
S/Leone	7.79	1.89	3.84	3.21	9.7
The Gambia	9.88	7.72	7.33	12.45	9.82

Source: An appraisal of candidates achievement in the West African Senior School Certificate Examination (WASSCE) among WAEC member countries by Mulika, A. Bello (Alhaja, Mrs), Registrar/CEO WAEC HQ Accra and Dr (Mrs) Oke, Deputy Resgistrar, WAEC HQ, Lagos

The statistics shows that less than 57% of the candidates had credit and above (A1 – C6) in Economics in all the countries during the period under consideration. The trend of performance fluctuated in all the countries throughout the period. Smitter (2008) warns that Economics as a subject is dying gradually in schools as a result of the reduction in the number of students being trained to become Economics teachers. Although Smitter identified some reasons which are that: Economics is a difficult subject which requires a strong grasp of Mathematics and this limits the number of those who are able to be admitted to the subject

area; Economics is not part of the compulsory subjects indicated in the National Policy on Education therefore some schools have squeezed out the subject; the methods of teaching used by Economics teachers make the subject complicated for the students to understand.

Ndupuechi (2009) concluded that the poor teaching and assessment methods being applied in schools had been the major problem of the students in senior secondary schools which do not make them to understand the major contents of Economics as a subject. Augustine (2010) who also subscribed to the assertion of poor teaching and assessment methodology in Economics also enumerated other problems to include lack of trained teachers; ill-equipped libraries and outdated textbooks. For students to be able to comprehend and use basic Economics concepts and principles, there is the need for widespread improvement in the teaching and assessment methods as these would yield enormous benefits to individual and the nation.

Augustine (2010) all observed that the field of Economics has placed too little value on the importance of assessments in recent decades. Augustine (2013) commented on the poor performance of students in Economics and recommended that appropriate teaching and assessment methods to be used in secondary schools. Mazzi in Doublegist (2013) stated that short supply of qualified economics teachers, poor teaching method, and insufficient use of instructional material in teaching economics and negative attitude of students toward the teacher aid in students' poor achievement in Economics.

Also Atanda and Jaiyeoba (2011) and Tahir (2012) all recommend appropriate new methods of teaching and assessment if improvement in students' performance in all

subjects is expected. They all agreed that the best method is only that which helps the particular students to achieve more. The teacher must therefore continue to search for the method which best serves his students' interest.

According to Chief examiners report on SSCE May/June 2014 shown that students' achievement in SSCE is poor. He pointed out some causes of students poor achievement as; improper use of academic syllabus, inability of students to understand questions, cheating in examination, misconduct of examination by the invigilators, inability to use approved text books and answering question more than required. In order to enhance the academic achievement of students in Economics, a better assessment mode delivery should be employed.

Basic issues in psychological testing. Psychological Assessment is one of the oldest fields of Psychology as well as it is one of the most extended applied fields. Therefore, challenges and developments for the future must be built from its productive past. First of all, several developments will take place as a logical continuation of the progress already made concerning psychological testing and measurements (Rocío, n.d).

Psychological test scores can be very useful under the proper circumstances—and when the limitations of psychological testing are properly understood, respected, and made plain. However, the score got on any psychological test is nothing more than "the score you have gotten on that test." For example, if one you took an IQ test and got a score of 126. Well, the IQ test score may be 126, as measured by that test, at that time, under those circumstances. But what is the real IQ? That is a big question, no one knows, and that is a fact. So what does an IQ test really measure? Well, again, no one knows and that is another fact (Raymond, 2017).

It is also worthy to note that every well-known and widely used psychological test in the US was developed and standardized in English. This might not seem very important, but just consider what happens when someone needs to be tested who does not speak English fluently. Some test translations have been made and validated through extensive scientific research. But if the test is translated spontaneously into another language, either in print or through a translator, all kinds of problems can occur. English words with multiple meanings cannot be adequately translated. English idioms cannot be expressed in another language without changing the entire sentence structure along with the underlying logic of the sentence—and when that happens standardization, and the guarantee of fairness it promises, is lost. So, even though translated versions of tests might be used, and even though one might be given a score that appears to be official and scientific, that score is nothing more than "the score gotten on that test" at that particular time and under those particular circumstances. This might not seem very significant to some people, and it might even seem like philosophical quibbling.

Since the beginning of the 20th century, from individual differences perspective, hundreds of personality and intelligence measurements devices have been developed. Concerning intelligence and aptitudes measurements, three sources of evolution could be expected:

1) Advances of cognitive psychology will yield new techniques for the evaluation of first-order mental process associated with simple as well as increasingly complex levels of human cognitive functioning through laboratory devices.

2) The so-called dynamic assessment of intelligence will continue to be a source of developments, important when we need to plan and program cognitive interventions.

3) The development of the Item Response Theory (IRT) will allow the progress of both computerized as well as adaptive intellectual tests. Personality assessment has expectation of three lines of developments:

1) The improvement of paper-and-pencil tests on the measurement of personality traits. As will be seen later on, these improvements will be passed by solving several biases in self-reports.

2) The developments of new tests linked to new personality and psycho-pathological constructs in the field of health and adaptation (for example, prone types of personality, rationality, and defensiveness).

3) The construction of new adaptive tests not only in the field of achievement but also in the measurement of attitudes and personality characteristics.

Advances in physiological technology have had an enormous influence on psychological assessment in the last decades. The application of instrumentation, especially to the study of emotion, but also to personality and intelligence, has been undertaken relatively recently. And will allow improving predictions at least in laboratory settings. For example Professor Matarazzo in 1992 has presented physiological measures of intelligence as one of the most important future developments of psychological assessment able to predict...success in school, as well as occupational attainment and other aspects of everyday living.

In spite of the fact that bio-physiological measurement and assessment is nowadays, extremely useful in basic psychological research and in the diagnosis and rehabilitation of individual cases, the predictive power of any of these biological indices in school achievement or occupational success or other progress in everyday life is not yet supported and it seems difficult that this will be reached. The expectation is that without taking into account environmental as well as

motivational factors, it will never be able to predict those multidimensional and molar behaviors.

Advances in the technology for administering and interpreting computerized versions of the already existing tests and other psychological instruments will be a common practice on assessment during the next decades. Also, a new generation of tests based on Item Response Theory together with artificial intelligence, computer modeling and other computer assisted strategies will produce improvements on theory and technology, as well as in assessment practice.

Empirical Studies

Empirical studies related to the present study have been extensively reviewed as follows

Studies on the effects of CBT and PPT on academic achievement. Ogunmakin and Osakuade (2014) examined the influence of computer anxiety and computer knowledge on candidates' performance in Computer-Based Test. The study used descriptive survey and ex-post facto designs. Methodology: Sample comprised 100 candidates (50 males and 50 females) in 2 purportedly chosen universities in Nigeria. A 20-item Computer Knowledge Test (CKT), a 20-item Computer Anxiety Scale (CAS) and a proforma to collect the UTME scores were used to collect data. Regression Analysis, ANOVA and t-test statistics were used to test hypotheses. The findings showed that computer knowledge and computer anxiety significantly combined to predict performance in CBT. They jointly accounted for 9.7 percent of the total variance in CBT performance ($R^2 = 0.097$, $F(2,99) = 5.208$, $P<0.05$). Computer knowledge is the only significant predictor of performance in CBT. It accounted for 29.2 percent of the total variance in CBT performance ($t = 3.019$, $p<0.05$). The study concluded that Computer knowledge

and computer anxiety jointly influenced candidates' performance in CBT in Nigeria.

Alisa (2014) conducted a study to determine to what extent there was a difference in student achievement, as measured by the Acuity Language Arts Diagnostic assessment, between students using a paper/pencil or a computer-based delivery method. A quantitative research design was used in this study. The population of interest was upper elementary students in the state of Missouri. The sample for the study included approximately 650 fifth and sixth grade students from Mill Creek Upper Elementary during the 2011-2012 school year. Findings revealed a statistically significant difference did exist between the sixth grade males and sixth grade females when taking the computer-based assessment. The mean achievement score for the sixth grade males on the computer-based assessment was more than 10% lower than the mean achievement score for the sixth grade females.

Although a statistically significant difference did exist between the sixth grade males and sixth grade females on the computer-based assessment, the same did not hold true for fifth grade male and fifth grade female study participants or for sixth grade male and sixth grade female participants who took the paper/pencil assessment. Additionally, a relationship between assessment delivery method and minority and socioeconomic status was not statistically significant. This research supports the comparability of paper/pencil and computer-based assessments but encourages those analyzing achievement data to continue to disaggregate the data by the demographics of gender, minority, and socioeconomic status.

In another study by Sanni and Mohammad (2015) perception of student on the use of computer based testing in examinations was investigated. The study adopted survey research method. Problems encountered by the student and prospective

methods of enhancing CBT acceptance in Nigeria were also documented. A total of 300 questionnaires were administered to students who participated in the 2014 UTME at Ahmadu Bello University (ABU), Zaria center and 237 were adequately completed and found usable representing (79%). The finding revealed among others, that majority of the respondents confirmed that CBT can curb examination malpractice. Majority of candidates were also found to prefer CBT than the conventional way of writing examination. The Chi-square and Pearson's correlation analysis showed that the respondents preferences for CBT was sensitive across gender, age distribution and student faculty. While improving electricity supply was identified as critical in enhancing CBT Exams, poor ICT skill on the part of student and the invigilators were identified as the major problem facing the implementation of JAMB CBT Exam.

Jimoh, AbdulJaleel and Kawu (2012) conducted a study on students' perception of CBT for undergraduate chemistry courses in University of Ilorin. To this end, it examined the potential for using student feedback in the validation of assessment. A convenience sample of 48 students who had taken test on CBT in chemistry was surveyed and questionnaire was used for data collection. Data analysis demonstrated an auspicious characteristics of the target context for the CBT implementation as majority (95.8%) of students said they were competent with the use of computers and 75% saying their computer anxiety was only mild or low but notwithstanding they have not fully accepted the testing mode with only 29.2% in favour of it.

Due to the impaired validity of the test administration which they reported as being many erroneous chemical formulas, equations and structures in the test items even though they have nonetheless identified the achieved success the testing has made

such as immediate scoring, fastness and transparency in marking. As quality of designed items improves and sufficient time is allotted according to the test difficulty, the test experience will become favourable for students and subsequently CBT will gain its validation in this particular context.

Gavin and Matthew (2005) reports the findings of an investigation of children's performance and attitude towards a paper based and computer based test. Twenty children, aged between 7 and 8 of mixed gender, participated in this study using a commercial software application. The children's attitude towards the software was captured through the use of a smarty-o-meter to indicate their level of preference and the performance was based on their tests scores. The raw scores for the two types of tests were analysed to determine whether there was a correlation and significant difference between the two. There was a strong correlation between the children's performance on the computer based and paper b ased test (rho = 0.647, P =0.002). The mean score for the paper based test was M=7.6SD=1.35 which is not significantly different (t=1.674, df=19, p=0.11) from that of the computer based test M= 7.0SD=2.10 . The children's scores were also compared to determine whether gender differences affected test performance.

On the paper based test t he mean scores for boys was M=7.78 SD=1.39, which is not significantly different (t=0.52 df=18 p=0.61) to the girls M=7.45 SD=1.36. Similar findings were shown with the computer based tests as there was no significant difference between the two groups, the means were identical for both genders M=7.0. Further analysis examined the difference between the children's scores on both the paper based test and the computer based test. I t was found that 50%of the children performed better on the paper based test , 25% on the computer based test with the remaining 25% showing no difference. The results

using the Smarty-o-meter indicated a strong preference for computer based testing with the mean score being M=3.5, SD=1.1 compared to M=1.5, SD=1.1for paper and overall 70% of the Smarties were allocated to computer based test. The children were also asked which method they would prefer to use at school and 65% chose computer over paper. The performance of the children did not appear to influence their preferred test method as 70% of the children who performed better on paper stipulated they would rather use the computer.

The distribution of Smarties between the two methods were analysed to see if there was any gender difference. It was found that both genders had a similar preference towards computer based testing with the boys allocating76% and the girls 66% of their Smarties to this test method. The conclusions highlight the children's preference for using computer in their assessment and shows that there was no difference in performance between the two test modes.

Joshua, Joshua and Ikiroma (2014) examined computer-based testing in Nigeria's university entrants' matriculation examination: readiness and acceptability of critical stake-holders. The research design was survey and sample for the study comprised 600 final year students in 10 secondary schools in Cross River State, Nigeria, using stratified random sampling to take care of gender, school location and school proprietorship variables. A structured questionnaire (with reliability of .81) was used to collect data, which were analyzed with percentage, mean, t-test and ANOVA. The results indicate that the level of readiness for CBT is high, but that of acceptability is moderate, with a relatively higher preference by students federal government owned and privately owned schools. It is concluded that Nigerian students are supportive

of innovations that would ensure international best practices in the nation's school system.

Oduntan, Ojuawo and Oduntan (2015) conducted a study on comparative analysis of student performance in CBT and PPT. A correlational analysis of CBT and PPT assessment method was used. This involves the use of questionnaire to collect data on the scores of students who wrote both CBT and PPT UTME exams in 2013 and 2014. Pearson Correlation was used for the analysis. Result showed a positive correlation in the scores of student, it is therefore concluded that, if students are well prepared for the CBT exams, their performance will be enhanced.

A study by Russell and Haney in Sanni & Mohammad (2015) compared traditional paper and pencil testing to computer-based testing to measure the performance of 120 middle school students on multiple-choice and written test questions. They found that students with prior computer experience, who were familiar with writing on computers, were more successful in writing computer responses. Clariana and Wallace (2002) investigated to confirm several key factors in CBT versus PPT assessment. Factors of the study were content familiarity, computer familiarity, competitiveness, and gender. The study used a post-test only designed with one factor, test mode (Computer-based and Paper-based). Students' score on 100-item multiple choice items and students' self-report on a distance learning survey were treated as dependent variables.

Four sections of Computer Fundamental Course consisting of 105 students were selected as sample of the investigations. Results showed that CBT delivery impacted positively on students' scores as compared to PPT. The study found that the CBT group out-performed the PPT group. Gender, competiveness, and

computer familiarity were not related to this performance difference, though content familiarity was.

Bodmann, and Robinson (2004) conducted an experimental study to compare speed and performances differences among CBTs and PPTs. In the experiment fifty-five undergraduate students enrolled in the subject of educational psychology, participated in the studies which were already familiar with CBTs. Both CBTs and PPTs contained 30MCQs items with 35 minute of time limit. The findings observed that undergraduates completed the CBT faster than PBT with no difference in scores. Research outcomes have thus supported the fact that when students are motivated and testing conditions are equivalent, there are no differences between the scores obtained via CBT or PPT (Lynch, Marson, Patry, & Berstein cited in Alabi, Isaa, & Oyekunle, 2012). Lim, CH, Ong, Wilder-Smith, Seet, (2006) examined medical students' attitude about CB Vs PB testing in Singapore. Through an online survey, 213 (53.5%) final-year MBBS students were tested out of which 91 (79.8%) preferred CBT, 11 (9.6%) preferred P&P format and 12 (10.5%) were un-sure.

The study found that 42 indicated that 42 liked CBT because of good quality of images and independent of assigned seating positions; 22 liked CBT because they could proceed at their own pace; one stated that CBT examinations was fun; 4 enjoyed the convenience of CBT and 6 cited "equality" as the reason they preferred CBT over P&P testing. Gary, Jones, McNeil and Kuma (2008) at the University of New South Wales, Sydney studied the effect of online formative assessment on learning. The outcomes support the contention that integrated well designed online formative assessments can have significant positive effects on learning. Web based formative assessments also support equity and

inclusiveness by allowing students to attempt each assessment anonymously on multiple occasions at anytime. Ayo, Akinyemi, Adebiyi, & Ekong (2007) on Nigerian University stated that 81.3% of the applicants were computer literate, while the remaining 18.7% were guided through the examination.

The total number 1023 (75.7%) of respondents who participated in the e-examination conducted in Covenant University took electronic examination for the first time and as such found the examination easy, a few found it a little challenging but adjusted with time. The study revealed that only 327 (24.2%) of the applicants had not been involved in any form of electronic examination before, and found it difficult. Karadeniz, (2009) studied the impact of paper based, web based and mobile based assessment on students' achievement. A group of 38 students were experimented for 3 weeks. Significant differences were found between the scores achieved by the students in second week but not in first week. The paper revealed that students had positive attitude towards web based and mobile based assessment due to ease of use, comprehensive and instant feedback.

Moreover, most favoured tests were web based and the least favoured were paper based. Jim and Sean (2006) concluded that the e-assessment can be justified in a number of ways. It can help avoid the meltdown of current paper-based systems; it can assess valuable life skills; and it canbe better for users. For example, by providing on demand tests with immediate feedback and perhaps diagnostic feedback, and more accurate results via adaptive testing, it can help improve the technical quality of tests by improving the reliability of scoring. Therefore, a proper preparation of the students for the exam via an introduction to the software, a CBT could be a good method to curtail examinations malpractice effectively.

Studies on effects CBT and PPT on test anxiety. Owolabi and Dahunsi (2014) investigated related factors and anxiety in a computerized testing situation (a case study of National Open University, Nigeria). The study adopted a correlation design with test anxiety in a computerized testing situation as dependent variable while the student related factors constituted independent variables. Three scales namely: Test Anxiety Scale (r = 0.84), Computer Anxiety Scale (r = 0.84) and Computer Experience Scale (r = 0.81) were used as instruments for data collection. Data collected were analysed using Frequency, Percentages, Pearson Product Moment Correlation (PPMC) coefficient and Multiple Regression analysis. The results of the analysis showed that those with higher computer experience had significant contributions to the variation in test anxiety in a computerized testing situation.

Gwen (2013) examined whether the use of computer-based assessments produce less text anxiety symptoms than traditional paper and pencil assessments. A total of 12 third grade students were invited to participate in this research. of the 12, six returned parental consent and student assent forms for a 50% participation rate. The participants were all eight and nine years old. There was one female and five male participants. There were 2 African American and 4 Caucasian students. The instrument used to collect data in this study was an adapted version of the Westside Test Anxiety Scale (Driscoll, 2004). It consists of ten items designed to self-assess anxiety symptoms. Driscoll reported the scale to be a reliable and valid measure of test-anxiety impairment (Driscoll). The researcher adapted the questions to make them more understandable to third grade students diagnosed with learning disabilities. Considering the changes made to the scale, the researcher chose to rename the resulting survey The Elementary Test Anxiety Scale.

The instrument is a self-reported measure students complete after a test/assessment to indicate how they felt during testing. Participants who took the math assessments via computer scored an average of 2.9 on the test anxiety scale leading the researcher to conclude that this group had a high normal level of test anxiety. The participants who took the math assessments via pencil and paper scored a slightly higher with an average score of 3.1 on the test anxiety scale. This score puts them in the moderately high category of test anxiety. Comparison of the types of test anxiety symptoms participants complained of indicated that both groups complained of similar levels worrying and cognitive difficulty. The paper and pencil test takers complained of a significantly higher level of physiological symptoms than the computer-based test takers. There were complaints of five physiological symptoms in the paper and pencil group, compared to two complaints of these types of symptoms in the computer-based group.

The researcher also compared the scores of both groups on the multiplication assessment. Despite a higher level of test anxiety, the paper and pencil group scored significantly higher on their assessments. Their average test score was 49.6%. The computer-based group scored an average of only 27.4% on their assessments.

A study on assessment of computer literacy skills and computer based testing anxiety of secondary school students in Adamawa and Taraba states; Nigeria was conducted by Dangut and Sakiyo (2014). The study adopted a correlation design to assess Senior Secondary School (SSS) students' Computer Literacy Skills (CLS) and their perceived level of anxiety when confronted with CBT. Two validated questionnaires; "Computer Basic Literacy Competence Questionnaire" (CBLCQ) and "Computer Based Assessment Anxiety Questionnaire" (CBAAQ) were

administered to 1595 final year senior secondary school students in 106 randomly selected senior secondary schools in Adamawa and Taraba states. The questionnaires yielded Cronbach Alpha reliability coefficients of 0.72 and 0.81 respectively. Four research questions and four hypotheses guided the study. Mean and standard deviation were used to answer the research questions. The t-test and Pearson Product Moment Correlation Coefficient were used to test the hypotheses. Results revealed that students have low competence in basic computer literacy skills and high level of anxiety towards CBT. There was also a weak positive relationship between computer competence and computer anxiety.

Summary of Review of Related Literature

The present study has reviewed a large body of related literature on CBT and PPT but the preference of stakeholders is still uncertain. Conclusions from related studies reviewed are not consistent regarding the best test delivery mode (CBT or PPT) as well as the performance of test taker related to the test delivery mode. This inconsistency is somehow expected due to the fact that there have been so many studies to different groups of examinees with different designs and data collection techniques in a wide range of content areas and a variety of item formats.

The results of a few studies which examined the effects CBTs, PPTs on test anxiety and academic achievement seemed inconsistent, providing no strong support whether CBTs or PPTs will induce additional test anxiety or impact performance. Also, the results of the effect of gender on students' performance in CBT and PPT are inconclusive in the studies reviewed. Some studies indicated that gender does not affects students' performance on CBT and PPT while other studies had opposite submissions.

Based on the research results and many unanswered questions on the impacts of CBT and PPT on students' academic achievement as well as whether either of the two test delivery modes induces students' test anxiety is of major concern to the present study.

CHAPTER THREE

METHOD

This chapter presents the procedure used in carrying out the study under the following sub-headings: Research Design, Area of the Study, Population of the Study, Sample and Sampling Technique, Instruments for Data Collection, Validation of the Instruments, Reliability of the Instruments, Experimental Procedure, Control of Extraneous Variables, Method of Data Collection and Method of Data Analysis.

Research Design

The design of this study was quasi-experimental design. It utilized the pretest-posttest non-randomized control group design involving two groups – the experimental group and control group. It is a quasi-experimental study because participants were not randomly assigned to groups. Intact classes were used to avoid labeling and for the fact that the school authorities would not permit disruption of classes for the sake of the research. Akuezuilo and Agu (2003) stated that in the school setting, it is not always possible to use pure experimental design in conducting educational research. This is due to the fact that it brings about hawthorne effect which makes the participants in the experiment change their behavioural tendencies as a result they are being monitored or observed.

Figure 1 shows the design used for study:

Group	Pre-test	Treatment	Post-test
Experimental Group	O_1	X_1	O_2
Control Group	O_1	-	O_2

Symbols
X_1 –   Treatment (CBT)
O_1 –   Pre-test
O_2 –   Post-test

Figure 1: Design of the Study

Area of the Study

The study was conducted in Oshimili South Local Government Area, Delta North Education Zone of Delta State. The Oshimili South Local Government comprised four towns namely Asaba, Oko, Okwe and Illah. The headquarters is Asaba town which also, is the Delta State capital. The State is along the bank of River Niger. It is located in the South-South geo-political zone of Nigeria and is, bounded on the East by Anambra State, on the West by Edo State, on the North by Kogi State and on the South by Atlantic Ocean. The State has three Education zones namely Delta South with eight local government areas, Delta North with nine local government areas and Delta central with eight local government areas.

The inhabitants of Oshimili South Local Government Area are mainly civil and public servants, students, business men and women. The Local Government Area was selected as area of the study because it is an urban area where secondary schools were provided with the computer facilities which were needed to carry out the present study.

Population of the Study

The population of this study comprised 973 SS II students who offered Economics in ten co-educational secondary schools in Oshimili South Local Government Area of Delta State (Ministry of Education, Exams and Standard, Asaba). The reason behind the selection of this school type was to ensure that male and female students were adequately included in the present study.

Also, SSII students were used because; it is at this level that students choose school subjects to offer in external exams whose administrative bodies may adopt CBT mode. Also, the students, not being external examination class like SS 3, were

more available for the study than their seniors who were busy preparing for WAEC, NECO, NABTEB and JAMB examinations.

Sample and Sampling Technique(s)

The sample of this study comprised 107 (49 males and 58 females) SSII students who offered Economics drawn from two co-educational secondary schools in Oshimili South Local Government Area, Delta North Education Zone of Delta State.

Purposive sampling technique was used to sample two co-educational secondary schools from the ten secondary schools in the Local Government Area. The two co-educational secondary schools selected had well equipped computer facilities which helped to facilitate the successful completion of the study.

Using simple random sampling technique, the researcher assigned one of the selected co-educational secondary schools to treatment group while the other was the control group. Two intact SSII classes were selected through balloting, one from each of the two co-educational secondary schools. The treatment group comprised 26 male and 30 female SSII students while the Control group comprised 23 male and 28 female SSII students. (See Table 2 for sample description)

Table 1: Sample Descriptions

Group	No Subjects	Assignments	Males	Females
Treatment	56	Non-random	26	30
Control	51	Non-random	23	28
Total	**107**		**49**	**58**

Instruments for Data Collection

Two instruments were used for data collection in this study. They are Economics Achievement Test (EAT) and Test Anxiety Inventory (TAI).

Economics achievement test (EAT). The EAT is a 40-item, 4-option multiple choice objective test on the theories of demand, supply and cost units of study in SSII Economics curriculum. Appendix IX, page 151 shows the table of specifications which was used in generating the EAT items. The preparation of the table of specifications ensured that students were assessed on all the selected units. In this way, the content validity of the test was ensured. The questions covered all levels of objectives in the cognitive domain (See Appendix I, page 125 for the initial draft of EAT and Appendix VI, page 139 for final version of EAT). The instrument was constructed by the researcher who is a subject specialist in Economics.

Test anxiety inventory (TAI). TAI was developed by Spielberger in 1980 and re-validated in Nigeria by Oladimeji (2005). It measures anxiety proneness to examinations and evaluative situations. The inventory was designed for secondary school students and undergraduates, and consists of 20 items. Three scores are generated with the inventory namely: Worry (W), Emotionality (E) and Total anxiety scores (T). Worry (W) refers to excessive preoccupation and concern about the outcome of a test, especially the consequences of failure. Emotionality (E) refers to an individual's behavioural reactions and feelings aroused by test situation. Total anxiety score (T) is the sum of W and E. It refers to total cognitive, affective and behavioural reactions to test/examination situations. Responses to the items vary from "almost never" to "almost always" with a minimum score of 20

and maximum of 80. TAI was used to collect data on the students' test anxiety in the present study (See Appendix II, page 130).

Validation of Instruments

Economics achievement test (EAT). Face and content validation were carried out for the EAT. The researcher sent two copies of EAT with the table of specifications to two experts, one in Educational Measurement and Evaluation and the other, a secondary school Economics teacher. These experts were requested to vet the items in terms of clarity of words, appropriateness to the class levels and plausibility of distracters in order to ascertain the face and content validity of the EAT. The corrections and suggestions made were used in producing the final version of EAT for trial testing. (See Appendix XXIII, page 194 for validators' comments).

Trial testing of the EAT. The 60-items on the table of specification were trial tested using 150 SSII students who offered Economics, from secondary schools in Oshimili North Local Government Area, Delta State. Feedback from this exercise was used for item analysis of the EAT.

Item analysis of the EAT. The duly completed EAT were collected and scored by the researcher. After the scoring, the researcher arranged the students' scores in descending order and selected $^1/_3$ of the upper scorers and $^1/_3$ lower scorers. Nworgu in Abanobi (2013), Nkwocha (2004) and Otubelu (2008) recommend the selection of $^1/_3$ of the upper scorers and $^1/_3$ lower scorers for item analysis. Nworgu as cited by Abanobi (2013) states that after item analysis, items with difficulty indices (p) between .30 and .70 as well as discrimination indices (d) between +.03 and +1.0 should be considered as valid items (See Appendices IV, page 135 and Appendix V, page 137 for details of item analysis). Items which met the above

criteria were included in the final version of the EAT. After the item analysis, 40-items out of 60-items were found adequate and selected in the final production of EAT (See Appendix VI, page 139 for final version of EAT).

Test anxiety inventory (TAI). The TAI used had been validated. Oladimeji (2005) said that different forms of validation such as concurrent, discriminant, construct and convergent validity were determined when it was used on Nigerian students.

Reliability of the Instruments

Economics achievement test (EAT). The reliability coefficient of EAT was determined using the Kuder Richardson formula 20. The 40-items of EAT selected after item analysis were again administered on 30 SSII students offering Economics selected from a secondary school different from the sampled secondary schools for the study. The Kuder Richardson formula 20 was used to compute reliability coefficient of EAT which yielded 0.95. This means that the instrument was deemed reliable for the study (See Appendix VII, page 142).

Test anxiety inventory (TAI). The reliability coefficient of TAI was determined using Cronbach Alpha formula. The TAI was administered on 30 SSII students offering Economics selected from a secondary school different from the sampled secondary schools for the study. The Cronbach Alpha formula was used to compute reliability coefficient of TAI which yielded 0.68. This means that the instrument (TAI) was deemed reliable for the study (See Appendix VIII, page 143).

Scoring of Instruments

For the Test Anxiety Inventory (TAI), the items were scored with the four-point rating scale ranging from 1 for "almost never" to 4 for "almost always" except item number one which was scored in reverse order. These scores were summated to obtain test anxiety score. The Economics Achievement Test (EAT) contained 40 questions. Questions carried equal marks and any correct answer was scored one while incorrect answer was scored zero.

Lesson plan

The lesson plans were validated by two experts, one in Educational Measurement and Evaluation and the other, a secondary school Economics class teacher. They were requested to examine the following:

i.   The lesson plans' coverage of the study units;

ii. The clarity of the stated lesson objectives;

iii. The appropriateness of the lesson objectives to the students' level;

iv. Appropriateness of the instructional method specified

v.   Appropriateness of the instructional materials specified;

vi. Adequacy of the students' activities

vii. Suitability of the evaluation questions as measured by the lesson objectives

The corrections, comments and suggestions by the experts were used to produce the final lesson plans. (See Appendix IX, page 145 for details of the lesson plan for experimental and control groups).

Experimental Procedure

This study involved two groups of subjects, i.e experimental group and control group. The experimental group was assessed with CBT while control group was assessed with PPT. On the first day of the experiment, the EAT was administered

in PPT mode as a pre-test to the students in the experimental group and control group. The TAI was equally administered as pre-test to the two groups after the completion of EAT. The pre-tests were administered by research assistants and were carefully monitored by the researcher. Data obtained from this exercise served as pre-test scores in this study. After the pre-test administration, lesson delivery exercise commenced.

The experimental group and control group were taught by their respective regular Economics teachers with the lesson plans prepared by the researcher. To ensure uniformity of the instruction, the researcher trained the Economics teachers as research assistants on how to effectively use the lesson plans prepared by the researcher for the two groups.

Training of the Research Assistants (Economics Teachers)

The researcher built rapport and familiarized himself with two regular Economics teachers, one in each of the selected schools. He enlightened these teachers on the necessity of this study and encouraged them to take the whole exercise very serious. The teachers in the selected schools were trained as research assistants by the researcher on how to effectively use the lesson plans. The research assistants, after training, taught students in the experimental and control groups separately in their various schools. The objective of training the research assistants (Economics teachers) was to enable them acquire the necessary competencies to carry out the experiment, thereby enhancing the achievement of uniform standard in carrying out the exercise. The research assistants were trained in the following areas; familiarization with the content, methods, performance objectives and activities of students in learning the units of instruction; use of the lesson plans prepared by the researcher; and familiarization with key concepts in the study. The training lasted

for a week after which the lesson delivery exercise commenced. The lesson delivery exercise lasted for five weeks.

Before the post-test, the researcher trained the experimental group and control group on how to use monitor, mouse, and keyboard for CBT. Because the students in experimental group and control group had well equipped computer laboratories in their schools, the CBT training session took place in the students' school premises using the school's computer facilities.

Training Session for Experimental Group and Control Group on CBT

The researcher first built rapport and familiarized himself with the students in experimental group and control group. He taught them extensively what Computer-Based Test (CBT) entails. In doing so, the researcher built confidence in the students to take CBT irrespective of their previous background knowledge on the use of computer.

The students were trained by the researcher on simple use of keyboard and mouse to answer questions on a computer monitor. The reason for training the experimental group and control group on how to use computer for CBT was because, the students had never been involved in CBT exam.

The training focused on three key features of a computer for the CBT i.e the monitor, keyboard, and mouse. The students were taught what monitor, keyboard, and mouse entail, as well as how to use them for CBT. The researcher used CBT designed on SSI Economics as an example for students' deeper understanding of how to take CBT (See Appendix XI, page 157).

At the end of the training, the researcher gave each student maximum of fifteen minutes to practice what has been taught on the computer. Also, the researcher

ensured that the students were trained to mastery of using CBT for exam. The practice built confidence in the students for CBT. The training lasted for four days, two days for each school.

The EAT in CBT mode was designed by the researcher in Microsoft word processor. The CBT designed by the researcher did not require internet connection for its use. To ensure that there was no bias in the test modes, CBT was designed to be identical in length, item content and sequence to the PPT. The CBT had the same 40 items displayed on the computer screen exactly as it appeared on the PPT format page by page. CBT participants were meant to indicate their responses by typing either a, b, c, or d from the keyboard at the bottom of each question frame. Just like examinees in PPT, examinees in CBT could move back and forth within the test by pressing upward and downward arrow keys on the keyboard respectively or scrolling up or down using mouse. The CBT participants could skip any item or answer questions in any order. Also, they could review and change their responses any number of times they needed.

30 sets of computer were used in this study to administer the tests. All were Zynox computers with 1600 MHz Pentium processors, 1Gb RAM, and 400Gb hard drives. The computers had the same 21 inch screen set at a resolution of 1024 x 768 pixels and a mouse attached, although each computer did have a built-in glide pad that could also be used in place of the mouse. Ensuring the equipment was the same for all test participants was essential as monitor resolution was a factor that could influence test results (Pommerich, 2004). All the computers were running Windows 8 as the operating system.

The researcher copied the CBT program into the 30 sets of computer which were used for examination. The 30 sets of computer were attached to Uninterrupted Power Supply (UPS), and also, the researcher ensured that there was a stand-by generator to forestall power outage during CBT session. The time limit for both CBT and PPT was 40 minutes. The students in experimental group were asked to report at the school computer laboratory where they sat for the CBT examination. The students in experimental group were divided into two because of the number computers for CBT; 30 students entered and completed the CBT examination in the first session and the remaining 26 students completed the CBT examination in the second session immediately after the first session finished. The researcher invigilated the CBT session and was present in the computer laboratory to clarify instructions pertaining to the operation of the computer, and to assist students having difficulty with the operation of computer during testing. The students in control group reported at one of the school's examination halls for the PPT examination. The PPT examination was invigilated by the students' regular Economics teacher.

All the groups were post-tested on achievement and test anxiety. EAT in CBT mode served as a post-test for the experimental group; while the control group was post-tested with EAT in PPT mode (See Appendices XI and XII, pages 154 and 157). After the achievement test, the TAI was also administered to all groups as post-test to determine the students' test anxiousness. Feedback from this exercise served as post-test scores of the study.

Control of Extraneous Variables

To control the extraneous variables which could affect the result of the study, the following measures were taken:

1. Effects of Pre-test on Post-test Scores:

The researcher gave six weeks interval between pretest and posttest which was long enough for the pre-test not to have influence on post-test. The post-test was different from the pre-test in terms of numbering of the questions

2. Experimenter's Bias:

The students were taught by their regular Economics teachers. The researcher occasionally monitored the teachers so as to ensure that they effectively kept to instructions and adhered to research standards.

3. Initial Group Differences:

ANCOVA was used for data analysis to remove any possible initial group difference.

4. Teacher Variable:

The teachers were given lesson plans covering the topics of the study which were prepared by the researcher. The teachers were strictly advised to keep to the instructional procedures for each lesson as stipulated in the lesson plans.

5. School Variable:

The sampled schools were drawn from the same neighborhood- Asaba,, and therefore assumed to be most likely to have the same environmental conditions, being urban, with equal opportunities to the same public facilities

6. Instructional Situation:

Homogeneity of instructional situation across groups was ensured as follows:

    i.   Teachers to participate in the study were trained.

    ii.   Teachers were strictly advised to keep to the instructional procedures in the lesson plans as prepared by the researcher.

    iii.   All the subjects were exposed to the same instructional content within the same regular time allocated to Economics Teachers in the school time table.

7. Class Interaction:

The schools used in the present study are situated wide apart, so no possible interaction of the subjects took place.

Method of Data Collection

The instruments for data collection in this study (EAT and TAI) were administered to the students in experimental group and control group. The EAT in PPT mode and TAI were administered as pre-test to the experimental and control groups. Data obtained from this served as pre-test scores. After six weeks, EAT in CBT mode was administered to experimental group as post-test while EAT in PPT mode was also administered to the control group as post-tests. After the achievement test, the TAI was also administered to the two groups as post-test to determine the students' test anxiety.

Method of Data Analysis

The data collected were analyzed using mean to answer the research questions. The Hypotheses were tested at .05 level of significance using Analysis of Covariance (ANCOVA). The analyses were done using Statistical Package for the Social Sciences (SPSS).

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF DATA

This chapter presents the analysis of data collected and the results. The analyses of the research questions and hypotheses are presented one after the other using tables. A summary of the major findings of the study is also presented.

Research Question 1: What are the mean achievement scores of students exposed to CBT and that of those exposed to PPT in Economics?

Table 2:

Mean Achievement Scores of Students Exposed to CBT and that of those Exposed to PPT in Economics (N=107)

Group	N	Pre-test $\overline{x}$	Post-test $\overline{x}$	Mean Difference
Experimental (CBT)	56	21.71	20.68	-1.03
Control (PPT)	51	21.33	22.06	0.73

The analysis on Table 2 shows the pre-test and post-test mean achievement scores of students exposed to CBT and PPT in Economics. The analyses further revealed that mean achievement score of students exposed to PPT is higher than that of the students exposed to CBT. However, it is a surprise that the pre-test score is higher than the post-test score in CBT which has a mean difference of -1.03.

Research Question 2: What are the mean achievement scores of male and female students exposed to CBT in Economics?

Table 3:

Mean Achievement Scores of Male and Female Students Exposed to CBT in Economics (N=56)

Experimental Group (CBT)	N	Pre-test $\bar{x}$	Post-test $\bar{x}$	Mean Difference
Male	26	22.23	20.85	-1.38
Female	30	21.27	20.53	-0.74

Table 3 shows the pre-test and post-test mean achievement scores of male and female students exposed to CBT in Economics. Furthermore, the analyses revealed that mean achievement score of male students exposed to CBT is slightly higher than that of female students exposed to CBT. Then again, it is surprise that there is a reduction in the post-test scores when compared to pre-test scores which resulted in negative mean difference.

Research Question 3: What are the mean achievement scores of male and female students exposed to PPT in Economics?

Table 4:
Mean Achievement Scores of Male and Female Students Exposed to PPT in Economics (N=51)

Control Group (PPT)	N	Pre-test $\bar{x}$	Post-test $\bar{x}$	Mean Difference
Male	23	24.17	23.39	-0.78
Female	28	19.00	20.96	1.96

The information on Table 4 shows the pre-test and post-test mean achievement scores of male and female students exposed to PPT in Economics. In addition, the analyses revealed that mean achievement scores of male students exposed to PPT is higher than that of their female counterparts exposed to PPT. However, it is

unexpected that the pre-test score is higher than the post-test score for male students in PPT which has a mean difference of -0.78.

Research Question 4: What are the mean test anxiety scores of students exposed to CBT and that of those exposed to PPT in Economics?

Table 5:
Mean Test Anxiety Scores of Students Exposed to CBT and that of those Exposed to PPT in Economics (N=107)

Group	N	Pre-test $\overline{x}$	Post-test $\overline{x}$	Mean Difference
Experimental (CBT)	56	39.80	40.68	0.88
Control (PPT)	51	42.86	41.75	-1.11

The data analyzed on Table 5 show the pre-test and post-test mean test anxiety scores of students exposed to CBT and PPT in Economics. Also, the analyses revealed that mean test anxiety scores of students exposed to PPT is higher than that of their counterparts exposed to CBT.

Research Question 5: What are the mean test anxiety scores of male and female students exposed to CBT in Economics?

Table 6:
Mean Test Anxiety Scores of Male and Female Students Exposed to CBT in Economics (N=56)

Experimental Group (CBT)	N	Pre-test $\overline{x}$	Post-test $\overline{x}$	Mean Difference
Male	26	38.15	37.50	-0.65
Female	30	41.23	43.43	2.20

Analysis on Table 6 shows the pre-test and post-test mean test anxiety scores of male and female students exposed to CBT in Economics. The analyses reveals

further that mean test anxiety scores of female students exposed to CBT is higher than the male students exposed to same test mode in Economics.

Research Question 6:

What are the mean test anxiety scores of male and female students exposed to PPT in Economics?

Table 7:
Mean Test Anxiety Scores of Male and Female Students Exposed to PPT in Economics (N=51)

Control Group (PPT)	N	Pre-test $\overline{x}$	Post-test $\overline{x}$	Mean Difference
Male	23	44.00	39.83	-4.17
Female	28	41.93	43.32	1.39

Information presented on Table 7 shows the pre-test and post-test mean test anxiety scores of male and female students exposed to PPT in Economics. In addition, the analyses reveal that mean test anxiety scores of female students exposed to PPT is higher than their male counterparts exposed to same test mode in Economics.

Hypothesis 1: The difference in the mean achievement scores of students exposed to CBT and that of those exposed to PPT in Economics is not significant

Table 8:
Tests of Between-Subjects Effects of Mean Achievement Scores of Students Exposed To CBT and that of those Exposed to PPT in Economics

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	759.512[a]	4	189.878	15.870	.000
Intercept	413.517	1	413.517	34.562	.000
Groups	65.755	1	65.755	5.496	.021
Gender	2.038	1	2.038	.170	.681
Pretest	632.918	1	632.918	52.900	.000
Groups * Gender	.175	1	.175	.015	.904
Error	1220.375	102	11.964		
Total	50691.000	107			
Corrected Total	1979.888	106			

*$p < 0.05$

The analyses on Table 8 reveal that test mode effect on achievement is significant given that $F_{(1,102)} = 5.496$, and $p < 0.05$ (.021 < 0.05). Therefore, the null hypothesis is rejected, thus, the difference in the mean achievement scores of students in CBT and PPT is significant. The students mean achievement score in PPT as could be seen from Table 2 is higher than that of those in CBT.

Hypothesis 2: The difference in the mean achievement scores of male and female students in Economics is not significant

Table 9:
Tests of Between-Subjects Effects of Mean Achievement Scores of Male and Female Students in Economics

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	759.512[a]	4	189.878	15.870	.000
Intercept	413.517	1	413.517	34.562	.000
Groups	65.755	1	65.755	5.496	.021
Gender	2.038	1	2.038	.170	.681
Pretest	632.918	1	632.918	52.900	.000
Groups * Gender	.175	1	.175	.015	.904
Error	1220.375	102	11.964		
Total	50691.000	107			
Corrected Total	1979.888	106			

p > 0.05

Table 9 shows that gender effect on achievement is not significant given that $F_{(1,102)} = .170$, and $p > 0.05$ (.681 > 0.05). Therefore, the null hypothesis is not rejected, thus, the difference in the mean achievement scores of male and female students is not significant.

Hypothesis 3: The difference in the mean achievement scores of male and female students exposed to CBT in Economics is not significant

Table 10:
Tests of Between-Subjects Effects of Mean Achievement Scores of Male and Female Students Exposed to CBT in Economics

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	355.915[a]	2	177.957	15.156	.000
Intercept	150.720	1	150.720	12.837	.001
Pretest	354.552	1	354.552	30.196	.000
Gender	.779	1	.779	.066	.798
Error	622.299	53	11.741		
Total	24924.000	56			
Corrected Total	978.214	55			

*p > 0.05

Table 10 reveals that $F_{(1,53)}$ = .066, and p > 0.05 (.798 > 0.05), this implies that gender effect on achievement of those exposed to CBT is not significant. Therefore, the null hypothesis is not rejected, thus, the difference in the mean achievement scores of male and female students exposed to CBT is not significant.

Hypothesis 4: The difference in the mean achievement scores of male and female students exposed to PPT in Economics is not significant

Table 11:
Test of Between Subject Effects of Mean Achievement Scores of Male and Female Students Exposed to PPT in Economics

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	354.642[a]	2	177.321	14.277	.000
Intercept	271.720	1	271.720	21.877	.000
Pretest	.472	1	.472	.038	.846
Gender	280.262	1	280.262	22.565	.000
Error	596.181	48	12.420		
Total	25767.000	51			
Corrected Total	950.824	50			

*p < 0.05

The result in Table 11 shows that $F_{(1,48)}$ = 22.565, and p < 0.05 (.000 < 0.05). This reveals that gender effect on achievement of those exposed to PPT is significant.

Consequently, the null hypothesis is rejected which implies that the difference in the mean achievement scores of male and female students exposed to PPT is significant. The mean achievement score of male students is higher that of their female counterparts.

Hypothesis 5: The interaction effect between gender and test mode with respect to achievement is not significant

Table 12:
Interaction Effect Between Gender and Test Mode with Respect to Achievement

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	759.512[a]	4	189.878	15.870	.000
Intercept	413.517	1	413.517	34.562	.000
Groups	65.755	1	65.755	5.496	.021
Gender	2.038	1	2.038	.170	.681
Pretest	632.918	1	632.918	52.900	.000
Groups * Gender	.175	1	.175	.015	.904
Error	1220.375	102	11.964		
Total	50691.000	107			
Corrected Total	1979.888	106			

p > 0.05

The analyses on Table 12 reveal that interaction effect between gender and test mode with respect to achievement is not significant given that $F_{(1,102)} = .015$, and p > 0.05 (.904 > 0.05). As a result, the null hypothesis is not rejected.

Hypothesis 6: The difference in the mean test anxiety scores of students exposed to CBT and that of those exposed to PPT in Economics is not significant

Table 13:

Test of Between Subject Effects of Mean Test Anxiety Scores of Students Exposed to CBT and that of those Exposed to PPT in Economics

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	3011.906[a]	4	752.977	10.959	.000
Intercept	4601.251	1	4601.251	66.967	.000
Groups	1.187	1	1.187	.017	.896
Gender	538.790	1	538.790	7.842	.006
Pretest2	2336.923	1	2336.923	34.012	.000
Groups * Gender	.838	1	.838	.012	.912
Error	7008.355	102	68.709		
Total	191531.000	107			
Corrected Total	10020.262	106			

*p > 0.05

Results on Table 13 show that $F_{(1,102)}$ = .017, and p > 0.05 (.896 > 0.05), this implies that test mode effect on mean test anxiety scores of students in Economics is not significant. So, the null hypothesis is not rejected implying that the difference in the mean test anxiety scores of students in CBT and PPT is not significant.

Hypothesis 7: The difference in the mean test anxiety scores of male and female students in Economics is not significant

Table 14:

Test of Between Subject Effects of Mean Test Anxiety Scores of Male and Female Students in Economics

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	3011.906[a]	4	752.977	10.959	.000
Intercept	4601.251	1	4601.251	66.967	.000
Groups	1.187	1	1.187	.017	.896
Gender	538.790	1	538.790	7.842	.006
Pretest2	2336.923	1	2336.923	34.012	.000
Groups * Gender	.838	1	.838	.012	.912
Error	7008.355	102	68.709		
Total	191531.000	107			
Corrected Total	10020.262	106			

*p < 0.05

Data as presented on Table 14 show that gender effect on male and female students' anxiety is significant based on the fact that $F_{(1,102)} = 7.842$, and $p < 0.05$ (.006 < 0.05). The null hypothesis is therefore rejected.

Hypothesis 8: The difference in the mean test anxiety scores of male and female students exposed to CBT in Economics is not significant

Table 15:
Test of Between Subject Effects of Mean Test Anxiety Scores of Male and Female Students Exposed to CBT in Economics

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	2004.886[a]	2	1002.443	14.591	.000
Intercept	3690.341	1	3690.341	53.713	.000
Pretest2	1514.538	1	1514.538	22.044	.000
Gender	310.043	1	310.043	4.513	.038
Error	3641.329	53	68.704		
Total	98312.000	56			
Corrected Total	5646.214	55			

$p < 0.05$

Analyses of Table 15 show that $F_{(1,53)} = 4.513$, and $p < 0.05$ (.038 < 0.05). This reveals that gender effect on mean test anxiety scores of students exposed to CBT in Economics is significant. Thus, the null hypothesis is rejected which implies that the difference in the mean test anxiety scores of male and female students exposed to CBT is significant. The female students are more test anxious than their male counterparts.

Hypothesis 9: The difference in the mean test anxiety scores of male and female students exposed to PPT in Economics is not significant

Table 16:
Test of Between Subject Effects of Mean Test Anxiety Scores of Male and Female Students Exposed to PPT in Economics

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	989.640[a]	2	494.820	7.081	.002
Intercept	1046.619	1	1046.619	14.978	.000
Pretest2	835.365	1	835.365	11.955	.001
Gender	244.621	1	244.621	3.501	.067
Error	3354.046	48	69.876		
Total	93219.000	51			
Corrected Total	4343.686	50			

p > 0.05

The result of Table 16 shows that gender effect on mean test anxiety scores of male and female students exposed to PPT in Economics is not significant given that $F_{(1,48)} = 3.501$, and $p > 0.05$ (.067 > 0.05). Therefore, the null hypothesis is not rejected implying that the difference in the mean test anxiety scores of male and female students exposed to PPT is not significant.

Hypothesis 10:

The interaction effect between gender and test mode with respect to anxiety is not significant

Table 17:
Interaction Effect Between Gender and Test Mode With Respect To Anxiety

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	3011.906[a]	4	752.977	10.959	.000
Intercept	4601.251	1	4601.251	66.967	.000
Groups	1.187	1	1.187	.017	.896
Gender	538.790	1	538.790	7.842	.006
Pretest2	2336.923	1	2336.923	34.012	.000
Groups * Gender	.838	1	.838	.012	.912
Error	7008.355	102	68.709		
Total	191531.000	107			
Corrected Total	10020.262	106			

*p > 0.05

Data as presented on Table 17 show that interaction effect between gender and test mode with respect to test anxiety is not significant based on the fact that $F_{(1,102)} = .012$, and $p > 0.05$ ($.912 > 0.05$). The null hypothesis is therefore not rejected.

Summary of the Findings

Based on the analyses presented in this chapter, the following major findings emerged:

1. The mean achievement scores of students exposed to PPT is higher than that of those exposed to CBT and the difference in their mean achievement scores is significant

2. The difference in the mean achievement scores of male and female students in Economics is not significant

3. The mean achievement scores of male students exposed to CBT is slightly higher than that of female students exposed to CBT but the difference in their mean achievement scores is not significant

4. The mean achievement scores of male students exposed to PPT is higher than that of female students exposed to PPT and the difference in their mean achievement scores is significant

5. Students exposed to PPT are more test anxious than those exposed to CBT but the difference in their mean test anxiety scores is not significant

6. The difference in the mean test anxiety scores of male and female students in Economics is significant

7. Female students exposed to CBT are more test anxious than the male students exposed to same test mode and a significant difference exists in their mean test anxiety scores

8. Female students exposed to PPT are more test anxious than their male counterparts exposed to same test mode. However, no significant difference was shown in their mean test anxiety scores

9. The interaction effect between gender and test mode with respect to either achievement or test anxiety is not significant.

CHAPTER FIVE

DISCUSSION OF RESULTS, CONCLUSION AND RECOMMENDATIONS

This chapter focuses on discussion of results, conclusion(s), implications of the study, recommendation(s), limitations of the study and suggestions for further studies.

Discussion of Results

The discussions are organized under the following sub-headings:

1.   Achievement Scores of Students in CBT and PPT in Economics

2.   Achievement Scores of Male and Female Students in Economics

3.   Test Anxiety Scores of Students in CBT and PPT in Economics

4.   Test Anxiety Scores Male and Female Students in Economics

5.   Interaction Effects Between Gender and Test Mode With Respect to Achievement and Test Anxiety

Achievement Scores of Students on CBT and PPT in Economics

The finding of this study showed that the mean achievement scores of students exposed to PPT was higher than that of the students exposed to CBT. Therefore, the difference in the mean achievement scores of students exposed to CBT and PPT was significant. The students' achievement scores in PPT being slightly higher than that of those in CBT was because students have been using PPT as form of assessment before then, so it was not strange to them. It was also a surprise that in some cases, pre-test scores on students' achievement in CBT/PPT was slightly higher than their post-test scores. This may be as a result of several reasons; the students might have been taught and tested on what they already knew thus, there was a slight difference in their pre-test scores and post-test scores. Also, during the experimental period, the students were engaged in other

school/classroom activities which might have distracted them from having 100 percent participation in the study. In addition, the study was more interested on the test mode which was the treatment and not on the lesson delivery exercise (teaching). Furthermore, the students' achievement score in CBT was slightly lower than that of their counterparts in PPT may be as a result of the fact that CBT was a new assessment approach. The students even after being trained in CBT might have found test on computer strange owing to the fact that CBT was still new to them.

The finding of this study corroborates the findings of Higgins, Russell, and Hoffmann (2005) in a study on comparison of Vermont students randomly assigned to complete a reading comprehension test on CBT or PPT which found that students completing the test on paper received a higher mean score, followed by their counterparts using computer based test. Added to that, Pommerich and Burden cited in Johnson and Green (2006 p.24) concluded that students taking the test in paper-and-pencil format "possessed a degree of independence and control on paper that allowed them access to strategies that could facilitate their performance." Similarly, Dermo and Eyre (2008) as well as George (2011) carried out a study on computer-mediated examinations, students' perceptions, students' attitude and performance. They found out that students believed the PPT enhanced their performance while CBT had a negative effect.

Furthermore, many studies such as Chuah, Drasgow and Roberts (2006) as well as Gosling, Vazire, Srivastava and John (2004) found significant differences between computer-administered testing and traditional paper and pencil testing. Equally, Karadeniz (2009) studied the impact of paper-based, web-based and mobile-based assessment on students' achievement. A group of 38 students

were used for experiment for 3 weeks. Significant differences were found between the scores achieved by the students in second week, but not in the first week. The authors found that students had positive attitude towards web-based, mobile-based assessment due to ease of use, comprehensive, and instant feedback. In the same way, some studies revealed that there is a significant difference between the two testing modes on test scores (Scheuermann & Björnsson, 2009; Choi, Kim, & Boo, 2003).

Achievement Scores of Male and Female Student in Economics

The finding revealed that the mean achievement scores of male students exposed to CBT was higher than that of female students exposed to CBT. Nevertheless, the difference in the mean achievement scores of male and female students exposed to CBT was not significant. Also, the mean achievement scores of male students exposed to PPT was higher than their female counterparts exposed to PPT. Thus, the difference in the mean achievement scores of male and female students exposed to PPT was significant. In addition, the difference in the mean achievement scores of male and female students exposed to CBT and that of those exposed to PPT was not significant. The male students might be very good and at home with recent technologies such as smart phones and computers. Probably, because male students were not afraid of these technologies, they had an edge in CBT exam than that of their female counterparts who may not be at home with these technologies.

The above finding is in agreement with the findings of Gallagher, Bridgeman and Calahan (2002) as well as Leeson (2006) who found that male examinees performed better on the CBT format than female examinees who showed slightly poorer performance on CBTs. More so, a number of studies have found that boys

outperform girls when tested on the computer, while girls perform significantly better on paper-and-pencil tests (Csapó et al., 2009; Halldórsson et al., 2009; Higgins et al., 2005; Lee, 2009; Martin & Binkley, 2009; Sórenson & Andersen, 2009). Researchers have hypothesized several reasons for this finding. Some suggest that although gender gaps in volume of computer usage have closed rapidly over the last few years, boys are much more likely to play online games and use game-type software that are similar to the flash animations and video footage used with many computer-based test items.

These activities expose boys more frequently to the content that appears in computerized tests. Others theorize that boys' higher performance on computerized tests may partially be explained by computer-based tests' lower reading load or a bias toward boys in the content of items included on computerized tests (Crusoe, 2005; Halldórsson et al., 2009; Martin & Binkley, 2009; Sórenson & Andersen, 2009). In the same fashion, Horkay et al (2005) used the National Assessment of Educational Progress' (NAEP) Writing Online (WOL) study to examine differences in students' performance on computer-based and paper and-pencil tests, based on their gender, ethnicity, parents' education level, income level (based on eligibility for free or reduced price lunch), and school location. WOL groups were composed of nationally representative groups of eighth grade students drawn from the main NAEP assessments. The researchers found no significant differences in either boys' or girls' performance on computer-based versus paper-and-pencil tests.

Again, Gavin and Matthew (2005) compared the children's scores to determine whether gender differences affected test performance. On the paper-based test the mean score for boys was M=7.78 SD=1.39, which was not significantly different

(t=0.52 df=18 p=0.61) from that of girls (M=7.45 SD=1.36). Similar findings were shown with the computer-based tests as there was no significant difference between the two groups, the means were the same for both genders (M=7.0). Further analysis examined the difference between the children's scores on both the paper-based test and the computer-based test. It was found that 50% of the children performed better on the paper-based test, 25% on the computer-based test with the remaining 25% showing no difference.

Finally, Alisa (2014) conducted a study to determine to what extent there was a difference in student achievement, as measured by the Acuity Language Arts Diagnostic assessment, between students using a paper/pencil or a computer-based delivery method. A quantitative research design was used in this study. The population of interest was upper elementary students in the state of Missouri. The sample for the study included approximately 650 fifth and sixth grade students from Mill Creek Upper Elementary during the 2011-2012 school year. Findings revealed that a statistically significant difference did exist between the sixth grade males and sixth grade females who took the computer-based assessment. The mean achievement score for the sixth grade males on the computer-based assessment was more than 10% lower than the mean achievement score for the sixth grade females. Although a statistically significant difference did exist between the sixth grade males and sixth grade females on the computer-based assessment, the same did not hold true for fifth grade male and fifth grade female study participants or for sixth grade male and sixth grade female participants who took the paper/pencil assessment.

Test Anxiety Scores of Students on CBT and PPT in Economics

The result showed that students exposed to PPT exhibited greater test anxiety than their counterparts exposed to CBT, even though, the difference in the mean test anxiety scores of students in CBT and PPT was not significant. This means that test mode has no effect on students' test anxiety. Surprisingly, it was unexpected that there was no significant difference in students' test anxiety in both CBT and PPT. One would have thought that CBT might induce additional anxiety on students but it never did, rather students in CBT exhibited less test anxiety more than their counterparts in PPT. This may be as a result proliferation of recent technologies such as smart phones, i-pad, laptops, computers which students see around their environments.

The above result corresponds with the findings of Wang and Chuang's (2002) on a study using junior high, high school, and college students. Measures of anxiety, test preference, adaptability of the test, and acceptance of test results all showed that students viewed the CBT with less anxiety and positive preference. Likewise, research conducted by Fritz and Marzeck cited by Gwen (2013) comparing two groups of junior high students, one group taking a PPT test and one group taking a CBT version of the same test, found lower rates of self-reported state test anxiety in the group taking the CBT version than students taking the PPT version. It is the general consensus that there is no significant difference between anxiety levels of students who take a PPT and those who take a CBT (Revuleta, Ximenez & Olea, 2003; Schult & McIntosh, 2004).

Test Anxiety Scores of Male and Female Students in Economics

The finding shows that female students exposed to CBT had more test anxiety than the male students exposed to same test mode. Hence, there was a significant difference in the mean test anxiety scores of male and female students exposed to CBT. Also, the female students exposed to PPT were more test anxious than their male counterparts exposed to PPT. But the difference was not significant. In addition, the difference in the mean test anxiety scores of male and female students exposed to CBT and that of those exposed to PPT was significant. This implies that gender affects students' test anxiety in CBT and PPT. The fact that male students are masculine in nature is an advantage for them, they tend to exhibit less test anxiety than their female counterparts on recent technologies such as computer.

In their own study, Cizek and Burg (2006) found female students to be more test anxious than their male counterparts. Nadeem, Akhtar, Saira and Syeda (2012) in a study, used a sample size of 200 students selected by stratified sampling. The researchers had three groups of male and female students each. In their research questionnaire (Otis Self- Administering Test of Mental Ability and Anxiety Measurement Scale) was selected as an instrument for the purpose of data collection. It is noteworthy to state that in their results the female students exhibited test anxiety more than the male students. Also, Jones, Johnson-Yale, Millermaier and Perez (2009) as well as Cooper (2006) conducted a meta-analysis on the past 20 years of research studying gender differences and the digital divide. He found out that girls and women expressed greater anxiety and more negative attitudes toward computers than boys and men. Girls according to Cooper (2006), learn from an early age that computers are an educational medium designed with boys in mind; this perception creates greater stress and anxiety

whenever girls and women interact. As a result of gender roles assigned by different cultures, many women have been brought up to see technology and its use as exclusively reserved for the male gender. Asuquo and Onasanya (2006) reported that women look at computers and see more than machines, thus considering computers as masculine and complicated to use. Supporting the above, Munusamy (2009), emphasized that many factors in and outside the classroom result in girls being turned away from computer technology. These factors include the media depicting men as experts in technology, societal expectations of different goals for boys and girls, the structure of learning tasks, the nature of feedback in performance situations and the organization of classroom sitting. Munusamy stated that these factors are often restrained, they go unnoticed, it is little wonder why boys are more knowledgeable in computer than girls.

Furthermore, Chukwu (2014) in a study on relationship among test anxiety, academic achievement and interest of senior secondary school students in geometry found a significant difference in the mean test anxiety of male and female students. However, in contrast to the finding of this study, male students' test anxiety was higher than that of their female counterparts.

In contrast to finding of this study, Tekinarslan (2008) reported that there was no significant difference between male and female students' computer anxiety. Tekinarslan further reported that as students' computer knowledge increased, computer anxiety level of student's decreased. On the same note, some studies reported that computer anxiety was not statistically significant for performance in CBT (Cassady & Gridley, 2005; Stowell & Bennett, 2010).

Interaction Effect Between Gender and Test Mode With Respect to Achievement and Test Anxiety

The finding shows that the interaction effect between gender and test mode with respect to either achievement or test anxiety was not significant. This implies that test mode and gender do not affect students' academic achievement and test anxiety. This finding agrees to the finding of Shermis, Mzunara, and Bublitz (2001) who used four test conditions to examine the differences between CATs and SATs in regard to test anxiety and measures of efficiency. They found no significant differences between the conditions for test anxiety or satisfaction with the testing situation. The only significant result was higher test anxiety scores for females compared to males. This result is most likely explained by the fact that the examinees were taking a Mathematics test, where differences in anxiety levels are commonly associated with stereotype threat (Shermis et al., 2001). The researchers found no significant interaction effects between gender, test mode and anxiety in this study either. Also, Fritts and Marszaleck (2010) investigating gender differences in test anxiety and CAT found no significant interaction between gender, test anxiety and test modality.

Conclusion(s)

The academic achievements and test anxiety scores of secondary school students are not the same when assessed with the test mode in Economics. The students' academic achievements and test anxiety scores in Economics do not depend on gender or test mode.

Implication of the Study

The study provided empirical evidence of secondary school students' achievement and test anxiety scores in CBT and PPT in Economics. A difference was found in

secondary school students' achievement on CBT and PPT, the difference was significant. This implies that academic achievement of secondary school students assessed with PPT is higher than their counterparts assessed with CBT.

Secondary school students exposed to PPT are more test anxious than those exposed to CBT even though the difference in their mean test anxiety scores was not significant. This implies that test anxiety of secondary school students are the same irrespective of the test mode used in assessment.

The implication of this is that the test mode (PPT) is better for all internal and external assessments of secondary student schools in Economics which may also apply in other secondary school subjects.

Recommendations

The following recommendations were made;

1. Examination bodies, secondary school authorities and other stake holders in education should use only PPT for assessment of secondary school students' academic achievement in various internal and external examinations conducted in the country.

2. Curriculum planners should make and implement policies that will ensure that secondary schools use only PPT for internal assessment of students' academic achievement in various subjects in the country.

3. The curriculum planners should make and implement policies that will mandate various examination bodies in the country to use only PPT for all external assessment of secondary school students' academic achievement in various subjects.

4. Government and various secondary school authorities should ensure there is enabling environment for assessment of students' academic achievement using PPT as this will reduce limitations of PPT.

Limitation of the Study

One of the limitations of this present study is the fact that PPT was used as pre-test. The study made use of 107 students; perhaps an increase in the number could bring about varied results. CBT training session and its exam was very cumbersome such that after these students have been trained to mastery in CBT, some of them still had challenges while using the computer for the test.

Suggestions for Further Studies

1. Further studies should be conducted on the same topic with a larger sample size and use students' school achievement as pre-test.

2. Further studies should be conducted in Nigeria to determine relative effectiveness of Computer Based Test (CBT), Paper and Pencil Test (PPT), and Dual Based Test (DBT) on academic achievement and test anxiety of secondary school students in Economics.

3. The present study may be replicated using secondary schools in the rural areas to compare the outcomes

4. Further studies should be conducted in Nigeria to determine relative effectiveness of Computer Based Test (CBT) and Paper and Pencil Test (PPT) on academic achievement and interest of secondary school students in Economics.

5. Further studies should be conducted to determine the effects of Paper and Pencil Assessment, Computer Based Assessment and Mobile Based Assessment on students' Achievement, Test Anxiety and Interest on Economics

6. Further studies on Path analysis of students academic achievement and test anxiety scores on computerized test and paper and pencil test in tertiary institutions in Nigeria

7. Further studies on effects of computer based test and paper and pencil test on students' academic achievement and test anxiety in other secondary school subjects

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APPENDIX I

INITIAL DRAFT OF ECONOMICS ACHIEVEMENT TEST (EAT)

NAME OF THE SCHOOL:…………………………………………………………………………

SEX: MALE ☐ **FEMALE** ☐ **CLASS: SSII TIME: $1^1/_2$ HRS**

Attempt all questions and CIRCLE appropriately the CORRECT OPTION.

1. Inferior goods are defined in Economics as goods (A) whose quality is low (B) consumed by very poor people (C) whose consumption falls when consumer income rises (D) which satisfy only basic needs

2. If two commodities are good substitutes for one another, e.g butter and margarine, an increase in the demand for one will reduce the demand for the other. This type of demand is called (A) composite demand (B) joint demand (C) derived demand (D) competitive demand

3. Recalling that at equilibrium d = s, calculate the equilibrium price (p) and equilibrium quantity (q) of these equations
d = 20 − $^1/_2$p and s = 8 + $^1/_4$p,
(a) p = ₦12, q = 16kg (b) p = ₦14, q = 10kg
(c) p = ₦16, q = 12kg (d) p = ₦12, q = 14kg

4. When the demand curve shifts to the right, it indicates that a larger quantity is demanded at each price. This is caused by one of the following (A) a fall in the price (B) a fall in income (C) a rise in the price of a complement (D) none of the above

5. Average cost is (A) the total cost of production (B) the extra cost of producing additional unit of output

(C) the cost of producing a unit of output
(D) variable cost

6. The quantity supplied of a commodity increases when (A) production increases (B) demand increases (C) price of the commodity increases (D) population of the country increases

7. If a price of a commodity falls and the quantity purchased of it does not rise, the commodity can be described as (A) normal (B) abnormal (C) inferior (D) superior

8. In a normal (typical) demand schedule, the quantity demanded is (A) directed related to price (B) inversely to price (C) independent of price (D) proportionally related to price

9. Which of the following is NOT a determinant of changes in supply?
(A) changes in the cost of production
(B) technical progress (C) weather
(D) changes in the number of buyers

10. A movement along a given demand curve for a good is caused by a change in (A) consumer income (B) the price of the good (C) taste (D) population

11. The downward sloping of the demand curve implies that (A) an increase in price leads to an increase in quantity demanded

(B) an increase in price leaves the quantity demanded unchanged   (C) a decrease in price leads to a decrease in quantity demanded   (D) a decrease in price leads to an increase in quantity demanded.

12. If AC= Average Cost, TC= Total Cost, VC= Variable Cost of production, FC= Fixed Cost, Q=quantity of goods, then

(A) AC= TC/Q; TC=VC+FC
(B) AC= (TC)Q; TC=VC+FC
(C) AC= TC/Q; TC= (VC)(FC)
(D) AC= TC – FC; VC= TC – AC

Unit of output	Total cost
1	20
2	32
3	42
4	48
5	50

Use the above table to answer questions 13 – 14

13. In the above table, the marginal cost of the 3rd unit of output is (A)   12 (B)   6 (C) 10   (D) 2

14. What is the marginal cost of the 2nd output? (A) 12   (B) 6   (C) 10   (D) 2

15. Demand for a commodity by a consumer is the quantity of that commodity that the consumer (A) demands at a given price at a point in time   (B) demands at a given price   (C) actually digests   (D) produces, given its price

16. Let TC= Total costs, TVC= Total variable costs, TFC= Total fixed costs, ATC= Average total costs, AVC= Average variable costs, AFC= Average fixed costs.

Then, which of the following is NOT true?
(A) TC= TFC+TVC   (B) ATC= AVC+AFC   (C) AFC= TFC/Q   (D) TVC= AVC/Q

17. Which of these is a sacrifice made in order to satisfying any want?
(A) variable cost (B) opportunity cost
(C) total cost   (D) prime cost

18. A shift in the demand curve for commodity when the supply curve is vertical will lead to a change in the (A) price only (B) quantity only   (C) quality only
(D)   price and quantity

19. Total fixed cost measures the cost of
(A) all plant and machinery   (B) all assets where quantity cannot be varied in the short run   (C) all assets upon which the firm has control   (D) property owned by the firm

20. If there is an increase in demand without a corresponding increase in supply, there will be a (A) rise in price (B) shift in demand curve to the left (C) fall in price (D) shift in supply curve to the right

21. Given that TC= TFC + TVC and TR = AR x Q, profit is equal to (A) (AR+Q) – TFC   (B) (TFC + TVC)/Q   (D) (AR x Q) – TC   (D) (TC x Q)/AR

22. Which of the following statements is TRUE of the effects of changes in demand and supply on price? (A) a decrease in supply will lead to a fall in price and a fall in the quantity bought and sold   (B) an increase in demand will lead to a fall in price and in quantity bought and sold
(C) a decrease in demand will lead to a rise in price and in the quantity bought and sold

(D) an increase in supply will lead to a fall in price and a rise in the quantity bought and sold

23. Given a market demand curve Q = 120 – 2p and supply curve Q = 4p, the equilibrium price and quantity respectively are (A) 20 and 80   (B) 30 and 120   (C) 40 and 60 (D) 60 and 240

24. Given that the total fixed cost is N1000, total variable cost N2500 and the output, 100 units. Find the average cost of producing one unit (A) N60 (B) N45 (C) N35   (D) N30

25. Which of the following falls continuously as output expands?
(A) average fixed cost   (B) marginal cost
(C) average variable cost   (D) average cost

26. For a supply curve, an increase in the price of a commodity will result in
(A) a decrease in supply   (B) a decrease in the quantity supplied   (C) an increase in supply   (D) an increase in the quantity supplied

27. A change in supply is best described as a
(A) movement along the supply curve
(B) shift of the supply curve to the left or to right   (C) shift of the supply curve to the left (D) shift of the supply curve to the right

28. A shift in supply curve indicates that a different quantity will be supplied at each possible price because (a) consumers are willing to pay higher prices (b) supply is facing competition   (c) other factors than price have changed   (d) price has changed

29. One of the reasons for an exceptional demand curve is the (A) expectation of a future change in price   (B) availability of credit facilities   (C) change in price of the commodity (D) availability of substitutes

30. Economists view cost as (A) real cost
(B) true cost   (C) opportunity cost
(D) all of the above

31. Accountants view cost as (A) forgone alternative   (B) real cost   (C) true cost
(D) money cost

32. The overall expenditure incurred for the production of a particular commodity is
(A) fixed cost   (B) variable cost
(C) total cost   (D) marginal cost

33. Fixed cost is also known as (A) total cost
(B) unavoidable cost   (C) marginal cost
(D) real cost

34. The cost which changes as the level of output changes is (A) variable cost
(B) total cost (C) fixed cost
(D) marginal cost

35. The cost which does not change as the level of output changes is (A) fixed cost
(B) true cost (C) total cost (D) variable cost

36. The cost of producing per unit of output is (A) average cost   (B) total cost
(C) fixed cost   (D) variable cost

37. An additional cost incurred in the production of a particular commodity is
(A) total cost (B) Marginal cost
(C) fixed cost   (D) variable cost

38. The ability and willingness of a consumer to pay for quantity of a

commodity is (A) effective demand (B) composite demand (C) competitive demand (D) complementary demand

39. Market demand schedule is also called (A) aggregate demand schedule (B) individual demand schedule (C) demand schedule (D) supply schedule

40. A table which shows different quantities of a commodity bought by consumers at various prices and at a particular time is called (A) demand schedule (B) supply schedule (C) individual demand schedule (D) individual supply schedule

41. A normal demand curve has a what slope? (A) positive (C) negative (C) positive and negative (D) all of the above

42. Change in quantity demand and change in demand are brought about by (A) price and factors affecting demand respectively (B) factors affecting demand and price respectively (C) income and price respectively (D) price and income respectively

43. Movement along a particular demand curve is also seen as (A) change in quantity demand (B) change in demand (C) change in supply (D) change in quantity supply

44. The demand for money is a (A) derived demand (B) composite demand (C) complementary demand (D) competitive demand

45. Commodities with close substitutes have

(A) composite demand (B) competitive demand (C) complementary demand (D) derived demand

46. The ability and willingness of producers to offer quantities of a commodity for sale is (A) demand (B) supply (C) price (d) selling

47. A curve which results when a supply schedule is plotted in a graph is called (A) demand curve (B) schedule curve (C) supply curve (D) price curve

48. The higher the price, the higher the quantity offered for sale while the lower the price, the lower the quantity offered for sale is the law of (A) demand (B) supply (C) buyers (D) producers

49. The normal supply curve has a (A) negative slope (B) positive slope (C) downward slope (D) none of the above

50. One of these is NOT a factor affecting supply of a commodity (A) cost of production (B) number of producers (C) new techniques of production (D) fashion and taste of consumers

Use the table below to answer questions 51 – 54

Qty	F C	V C	T C	A C	M C
1	750	?	950	950	-
2	?	560	1310	?	360
3	750	900	?	550	?

51. What is fixed cost for the second quantity? (A) 750 (B) 700 (C) 600 (D) 0

52. What is the variable cost for the first quantity? (A) 200 (B) 150 (C) 250 (D) 300

88. The total cost of the third quantity is (A) 1650 (B) 1300 (C) 900 (D) 360

53. The marginal cost for the third quantity is (A) 360 (B) 300 (C) 340 (D) 400

54. What is the average cost for the second quantity? (A) 655 (B) 400 (C) 500 (D) 1000

55. In the table below, the marginal cost when output is two units is

Output in Units	Total Cost
1	20
2	56
3	96
4	144
5	160

(A) ₦ 36 (B) ₦20 (C) ₦16 (d) ₦40

56. The price which equates quantity demand and quantity supply is
(A) price stability (B) equilibrium quantity (C) equilibrium price (D) price equality

57. Given the supply function qs = 20 + 2p, find qs when p = 10 (A) 20 units (B) 30 units (C)   40 units   (D)   50 units

58. Looking at the table below, what is the equilibrium price

59. Using the table above, at price of ₦2, quantity supplied is (A) 10 units (B) 20 units (C) 40 units (D) 50 units

60. Which of the following is NOT a determinant of changes in supply?
(A) Changes in the cost of production
(B) technical progress (C) changes in price
(D) weather

APPENDIX II
TEST ANXIETY INVENTORY (TAI)

NAME:……………………………………………………………………………..

EXAMINATION NO:……………………………………………………………......

SEX: ………………………………………………………………………………….

INSTRUCTIONS: ANSWER THE FOLLOWING QUESTIONS TRUTHFULLY.

PLEASE NOTE THAT THIS EXERCISE HAS NOTHING TO DO WITH YOUR PERFORMANCE OR ASSESSMENT OF THE EXAMINATION YOU ARE ABOUT TO DO.

A number of statements which people have used to describe themselves are given below. Read each statement and circle the appropriate number to the right of the statement to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on only one statement but give the answer which seems to describe how you generally feel. 1 = Almost Never, 2 = Sometimes, 3 = Often and 4 = Almost Always

1. I feel confident and relaxed while taking tests.	1 2 3 4
2. While taking examinations I have an upset feeling.	1 2 3 4
3. Thinking about my grade in a course interferes with my work on tests.	1 2 3 4
4. I freeze up in important exams.	1 2 3 4
5. During examinations I find myself thinking about whether I"ll ever get through school.	1 2 3 4
6. The harder I work at taking a test, the more confused I get.	1 2 3 4
7. Thoughts of doing poorly interfere with my concentration on test.	1 2 3 4
8. I feel very jittery when taking an important test.	1 2 3 4
9. Even when I"m well prepared for a test, I feel very nervous about it.	1 2 3 4
10. I start feeling very uneasy just before getting a test paper back.	1 2 3 4
11. During tests I feel very tense.	1 2 3 4
12. I wish examination did not bother me so much.	1 2 3 4
13. During important tests I am so tense that my stomach gets upset.	1 2 3 4
14. I seem to defeat myself while working on important tests.	1 2 3 4

15. I feel very panicky when I take an important test.   1 2 3 4

16. I worry a great deal before taking an important examination.   1 2 3 4

17. During test I find myself thinking about the consequences of failing.   1 2 3 4

18. I feel my heart beating very fast during important tests.   1 2 3 4

19. After an exam is over I try to stop worrying about it, but I just can't.   1 2 3 4

20. During examinations I get so nervous that I forget facts I really know.   1 2 3 4

THANK YOU FOR YOUR CO-OPERATION. GOOD LUCK.

APPENDIX III

OPTIONS SELECTED BY THE UPPER AND LOWER SCORERS

N = 150, then 1/3 of 150 = 50. A total of 50 upper scorers and 50 lower scorers were used for the item analysis. The tables below shows the options selected by the upper and lower scorers for items 1 to 60

1.	A	B	C	D
U	3	5	38	4
L	15	10	18	7

10.	A	B	C	D
U	8	31	7	4
L	8	17	9	16

2.	A	B	C	D
U	2	12	6	30
L	6	20	8	16

11.	A	B	C	D
U	9	4	4	33
L	13	8	7	22

3.	A	B	C	D
U	4	5	36	5
L	14	6	21	9

12.	A	B	C	D
U	5	34	7	4
L	7	19	9	15

4.	A	B	C	D
U	4	2	5	39
L	7	4	21	18

13.	A	B	C	D
U	2	8	37	3
L	12	11	20	7

5.	A	B	C	D
U	5	5	34	6
L	9	10	23	8

14.	A	B	C	D
U	5	2	39	4
L	10	6	18	16

6.	A	B	C	D
U	1	8	37	4
L	13	10	22	5

15.	A	B	C	D
U	34	3	3	10
L	19	7	11	13

7.	A	B	C	D
U	6	4	35	5
L	14	6	20	10

16.	A	B	C	D
U	36	2	6	6
L	21	5	8	16

8.	A	B	C	D
U	2	40	7	1
L	12	21	11	6

17.	A	B	C	D
U	2	38	4	6
L	6	20	10	14

9.	A	B	C	D
U	18	10	9	13
L	21	15	6	8

18	A	B	C	D
U	12	18	11	9
L	8	15	20	7

19.	A	B	C	D
U	35	3	2	10
L	19	4	12	15

20.	A	B	C	D
U	38	5	5	2
L	21	6	8	15

21.	A	B	C	D
U	4	2	39	5
L	5	10	23	12

22.	A	B	C	D
U	10	11	17	12
L	10	19	3	18

23.	A	B	C	D
U	39	1	3	7
L	20	4	4	22

24.	A	B	C	D
U	3	2	33	12
L	11	7	16	16

25.	A	B	C	D
U	3	4	4	39
L	13	9	10	18

26.	A	B	C	D
U	4	5	1	40
L	15	7	5	23

27.	A	B	C	D
U	20	12	15	3
L	17	25	5	3

28.	A	B	C	D
U	13	21	7	9
L	23	10	12	5

29.	A	B	C	D
U	16	17	12	5
L	21	15	10	4

30.	A	B	C	D
U	4	3	4	39
L	18	4	7	21

31.	A	B	C	D
U	2	6	4	38
L	13	10	8	19

32.	A	B	C	D
U	3	5	41	1
L	8	15	21	3

33.	A	B	C	D
U	4	37	7	2
L	11	17	16	6

34.	A	B	C	D
U	39	1	7	3
L	22	4	15	9

35.	A	B	C	D
U	33	9	4	4
L	16	18	7	9

36.	A	B	C	D
U	41	2	2	5
L	19	11	8	12

37.	A	B	C	D
U	12	31	4	3
L	17	16	8	9

38.	A	B	C	D
U	35	2	4	9
L	18	5	8	19

39.	A	B	C	D
U	12	15	16	7
L	20	13	10	7

40.	A	B	C	D
U	36	4	2	8
L	21	7	10	12

41.	A	B	C	D
U	4	37	5	4
L	10	15	9	6

42.	A	B	C	D
U	20	12	8	10
L	23	15	6	6

43.	A	B	C	D
U	21	9	12	8
L	20	10	12	8

44.	A	B	C	D
U	34	3	3	10
L	19	6	12	13

45.	A	B	C	D
U	2	39	3	6
L	5	21	12	12

46.	A	B	C	D
U	4	40	6	0
L	6	31	8	5

47.	A	B	C	D
U	4	2	37	7
L	6	5	16	23

48.	A	B	C	D
U	9	41	0	0
L	9	38	2	1

49.	A	B	C	D
U	3	39	6	2
L	10	19	15	6

50.	A	B	C	D
U	9	12	11	18
L	5	15	10	20

51.	A	B	C	D
U	37	4	2	7
L	15	18	8	9

52.	A	B	C	D
U	39	3	5	3
L	20	7	17	6

53.	A	B	C	D
U	4	4	41	1
L	12	11	23	4

54.	A	B	C	D
U	36	9	3	2
L	17	16	9	8

55.	A	B	C	D
U	39	2	5	4
L	24	6	11	9

56.	A	B	C	D
U	1	10	35	4
L	6	15	18	11

57.	A	B	C	D
U	2	8	37	3
L	8	11	21	10

58.	A	B	C	D
U	4	10	34	2
L	7	16	19	8

59.	A	B	C	D
U	1	43	3	3
L	10	24	5	11

60.	A	B	C	D
U	3	6	36	5
L	6	12	25	7

APPENDIX IV
ITEM ANALYSIS FOR ECONOMICS ACHIEVEMENT TEST (EAT)
FOR DIFFICULTY AND DISCRIMINATION INDICES, ITEMS 1-35

ITEMS	UPPER SCORERS	LOWER SCORERS		DIFFICULTY INDICES		DISCRIMINATION INDICES
1	38	18	56	0.56	20	0.4
2	30	16	46	0.46	14	0.28
3	36	21	57	0.57	15	0.3
4	39	18	57	0.57	21	0.42
5	34	23	57	0.57	11	0.22
6	37	22	59	0.59	15	0.3
7	35	20	55	0.55	15	0.3
8	40	21	61	0.61	19	0.38
9	13	8	21	0.21	5	0.1
10	31	17	48	0.48	14	0.28
11	33	22	55	0.55	11	0.22
12	34	19	53	0.53	15	0.3
13	37	20	57	0.57	17	0.34
14	39	18	57	0.57	21	0.42
15	34	19	53	0.53	15	0.3
16	36	21	57	0.57	15	0.3
17	38	20	58	0.58	18	0.36
18	12	8	20	0.2	4	0.08
19	35	19	54	0.54	16	0.32
20	38	21	59	0.59	17	0.34
21	39	23	62	0.62	16	0.32
22	12	18	30	0.3	-6	-0.12
23	39	20	59	0.59	19	0.38
24	33	16	49	0.49	17	0.34
25	39	18	57	0.57	21	0.42
26	40	23	63	0.63	17	0.34
27	12	25	37	0.37	-13	-0.26
28	13	23	36	0.36	-10	-0.2
29	16	21	37	0.37	-5	-0.1
30	39	21	60	0.6	18	0.36
31	38	19	57	0.57	19	0.38
32	41	21	62	0.62	20	0.4
33	37	17	54	0.54	20	0.4
34	39	22	61	0.61	17	0.34
35	33	16	49	0.49	17	0.34

ITEM ANALYSIS FOR ECONOMICS ACHIEVEMENT TEST (EAT)
FOR DIFFICULTY AND DISCRIMINATION INDICES, ITEMS 36-60

ITEMS	UPPER SCORERS	LOWER SCORERS		DIFFICULTY INDICES		DISCRIMINATION INDICES
36	41	19	60	0.6	22	0.44
37	31	16	47	0.47	15	0.3
38	35	18	53	0.53	17	0.34
39	12	20	32	0.32	-8	-0.16
40	36	21	57	0.57	15	0.3
41	37	15	52	0.52	22	0.44
42	20	23	43	0.43	-3	-0.06
43	21	20	41	0.41	1	0.02
44	34	19	53	0.53	15	0.3
45	39	21	60	0.6	18	0.36
46	40	31	71	0.71	9	0.18
47	37	16	53	0.53	21	0.42
48	41	38	79	0.79	3	0.06
49	39	19	58	0.58	20	0.4
50	18	20	38	0.38	-2	-0.04
51	37	15	52	0.52	22	0.44
52	39	20	59	0.59	19	0.38
53	41	23	64	0.64	18	0.36
54	36	17	53	0.53	19	0.38
55	39	24	63	0.63	15	0.3
56	35	18	53	0.53	17	0.34
57	37	21	58	0.58	16	0.32
58	34	19	53	0.53	15	0.3
59	43	24	67	0.67	19	0.38
60	36	25	61	0.61	11	0.22

APPENDIX V
ITEM ANALYSIS OF ECONOMICS ACHIEVEMENT TEST (EAT)
FOR DISTRACTER INDICES, ITEMS 1-35

ITEMS	UPPER SCORS	LOWER SCORS		D.I	UPPER SCORS	LOWER SCORS		D.I	UPPER SCORS	LOWER SCORS		D.I
1	3	15	12	0.24	5	10	5	0.1	4	7	3	0.06
2	2	6	4	0.08	12	20	8	0.16	6	8	2	0.04
3	4	14	10	0.2	5	6	1	0.02	5	9	4	0.08
4	4	7	3	0.06	2	4	2	0.04	5	21	16	0.32
5	5	9	4	0.08	5	10	5	0.1	6	8	2	0.04
6	1	13	12	0.24	8	10	2	0.04	4	5	1	0.02
7	6	14	8	0.16	4	6	2	0.04	5	10	5	0.1
8	2	12	10	0.2	7	11	4	0.08	1	6	5	0.1
9	18	21	3	0.06	10	15	5	0.1	9	6	-3	-0.06
10	8	8	0	0	7	9	2	0.04	4	16	12	0.24
11	9	13	4	0.08	4	8	4	0.08	4	7	3	0.06
12	5	7	2	0.04	7	9	2	0.04	4	15	11	0.22
13	2	12	10	0.2	8	11	3	0.06	3	7	4	0.08
14	5	10	5	0.1	2	6	4	0.08	4	16	12	0.24
15	3	7	4	0.08	3	11	8	0.16	10	13	3	0.06
16	2	5	3	0.06	6	8	2	0.04	6	16	10	0.2
17	2	6	4	0.08	4	10	6	0.12	6	14	8	0.16
18	18	15	-3	-0.06	11	20	9	0.18	9	7	-2	-0.04
19	3	4	1	0.02	2	12	10	0.2	10	15	5	0.1
20	5	6	1	0.02	5	8	3	0.06	2	15	13	0.26
21	4	5	1	0.02	2	10	8	0.16	5	12	7	0.14
22	10	10	0	0	11	19	8	0.16	17	3	-14	-0.28
23	1	4	3	0.06	3	4	1	0.02	7	22	15	0.3
24	3	11	8	0.16	2	7	5	0.1	12	16	4	0.08
25	3	13	10	0.2	4	9	5	0.1	4	10	6	0.12
26	4	15	11	0.22	5	7	2	0.04	1	5	4	0.08
27	20	17	-3	-0.06	15	5	-10	-0.2	3	3	0	0
28	21	10	-11	-0.22	7	12	5	0.1	9	5	-4	-0.08
29	17	15	-2	-0.04	12	10	-2	-0.04	5	4	-1	-0.02
30	4	18	14	0.28	3	4	1	0.02	4	7	3	0.06
31	2	13	11	0.22	6	10	4	0.08	4	8	4	0.08
32	3	8	5	0.1	5	15	10	0.2	1	3	2	0.04
33	4	11	7	0.14	7	16	9	0.18	2	6	4	0.08
34	1	4	3	0.06	7	15	8	0.16	3	9	6	0.12
35	9	18	9	0.18	4	7	3	0.06	4	9	5	0.1

ITEM ANALYSIS OF ECONOMICS ACHIEVEMENT TEST (EAT)
FOR DISTRACTER INDICES, ITEMS 36-60

ITEMS	UPPER SCORS	LOWER SCORS		D.I	UPPER SCORS	LOWER SCORS		D.I	UPPER SCORS	LOWER SCORS		D.I
36	12	11	-1	0.02	2	8	6	0.12	5	12	7	0.14
37	12	17	5	0.1	4	8	4	0.08	3	9	6	0.12
38	2	5	3	0.06	4	8	4	0.08	9	19	10	0.2
39	15	13	-2	0.04	16	10	-6	0.12	7	7	0	0
40	4	7	3	0.06	2	10	8	0.16	8	12	4	0.08
41	4	10	6	0.12	5	19	14	0.28	4	6	2	0.04
42	12	15	3	0.06	8	6	-2	0.04	10	6	-4	0.08
43	9	10	1	0.02	12	12	0	0	8	8	0	0
44	3	6	3	0.06	3	12	9	0.18	10	13	3	0.06
45	2	5	3	0.06	3	12	9	0.18	6	12	6	0.12
46	4	6	2	0.04	6	8	2	0.04	0	5	5	0.1
47	4	6	2	0.04	2	5	3	0.06	7	23	16	0.32
48	9	9	0	0	0	2	2	0.04	0	1	1	0.02
49	3	10	7	0.14	6	15	9	0.18	2	6	4	0.08
50	9	5	-4	0.08	12	15	3	0.06	11	10	-1	0.02
51	4	18	14	0.28	2	8	6	0.12	7	9	2	0.04
52	3	7	4	0.08	5	17	12	0.24	3	6	3	0.06
53	4	12	8	0.16	4	11	7	0.14	1	4	3	0.06
54	9	16	7	0.14	3	9	6	0.12	2	8	6	0.12
55	2	6	4	0.08	5	11	6	0.12	4	9	5	0.1
56	1	6	5	0.1	10	15	5	0.1	4	11	7	0.14
57	2	8	6	0.12	8	11	3	0.06	3	10	7	0.14
58	4	7	3	0.06	10	16	6	0.12	2	8	6	0.12
59	1	10	9	0.18	3	5	2	0.04	3	11	8	0.16
60	3	6	3	0.06	6	12	6	0.12	5	7	2	0.04

APPENDIX VI

FINAL VERSION OF ECONOMICS ACHIEVEMENT TEST (EAT)

NAME OF THE SCHOOL:…………………………………………………………………

SEX: MALE ☐ **FEMALE** ☐ **TIME: 40 MINUTES** **CLASS: SSII**

ATTEMPT ALL QUESTIONS AND CIRCLE THE CORRECT OPTION APPROPRIATELY

EXAMPLE: What is the name of a person who gave most widely acceptable definition of Economics? **(A)** Lionel Robbins (B) John Smith (C) Davenport (D) Alfred Marshall

1. Inferior goods are defined in Economics as goods (A) whose quality is low (B) consumed by very poor people (C) whose consumption falls when consumer income rises (D) which satisfy only basic needs

2. If two commodities are good substitutes for one another, e.g butter and margarine, an increase in the demand for one will reduce the demand for the other. This type of demand is called (A) composite demand (B) joint demand (C) derived demand (D) competitive demand

3. When the demand curve shifts to the right, it indicates that a larger quantity is demanded at each price. This is caused by one of the following (A) a fall in the price (B) a fall in income (C) a rise in the price of a complement (D) none of the above

4. The quantity supplied of a commodity increases when (A) production increases (B) demand increases (C) price of the commodity increases (D) population of the country increases

5. If a price of a commodity falls and the quantity purchased of it does not rise, the

commodity can be described as (A) normal (B) abnormal (C) inferior (D) superior

6. A movement along a given demand curve for a good is caused by a change in (A) consumer income (B) the price of the good (C) taste (D) population

7. If AC= Average Cost, TC= Total Cost, VC= Variable Cost of production, FC= Fixed Cost, Q=quantity of goods, then

(A) AC= TC/Q; TC=VC+FC
(B) AC= (TC)Q; TC=VC+FC
(C) AC= TC/Q; TC= (VC)(FC)
(D) AC= TC − FC; VC= TC − AC

Unit of output	Total cost
1	20
2	32
3	42
4	48
5	50

Use the above table to answer questions 8 – 9

8. In the above table, the marginal cost of the 3rd unit of output is (A) 12 (B) 6 (C) 10 (D) 2

9. What is the marginal cost of the 2nd output? (A) 12 (B) 6 (C) 10 (D) 2

10. Demand for a commodity by a consumer is the quantity of that commodity that the consumer (A) demands at a given price at a point in time (B) demands at a given price (C) actually digests (D) produces, given its price

11. Let TC= Total costs, TVC= Total variable costs, TFC= Total fixed costs, ATC= Average total costs, AVC= Average variable costs, AFC= Average fixed costs. Then, which of the following is NOT true? (A) TC= TFC+TVC (B) ATC= AVC+AFC (C) AFC= TFC/Q (D) TVC= AVC/Q

12. Which of these is a sacrifice made in order to satisfying any want?
(A) variable cost (B) opportunity cost
(C) total cost (D) prime cost

13. Total fixed cost measures the cost of
(A) all plant and machinery (B) all assets where quantity cannot be varied in the short run (C) all assets upon which the firm has control (D) property owned by the firm

14. If there is an increase in demand without a corresponding increase in supply, there will be a (A) rise in price (B) shift in demand curve to the left (C) fall in price (D) shift in supply curve to the right

15. Given that TC= TFC + TVC and TR = AR x Q, profit is equal to (A) (AR+Q) − TFC (B) (TFC + TVC)/Q (D) (AR x Q) − TC (D) (TC x Q)/AR

16. Given a market demand curve Q = 120 − 2p and supply curve Q = 4p, the equilibrium price and quantity respectively are (A) 20 and 80 (B) 30 and 120 (C) 40 and 60 (D) 60 and 240

17. Given that the total fixed cost is N1000, total variable cost N2500 and the output, 100 units. Find the average cost of producing one unit (A) N60 (B) N45 (C) N35 (D) N30

18. Which of the following falls continuously as output expands?
(A) average fixed cost (B) marginal cost
(C) average variable cost (D) average cost

19. Economists view cost as (A) real cost
(B) true cost (C) opportunity cost
(D) all of the above

20. Accountants view cost as (A) forgone alternative (B) real cost (C) true cost
(D) money cost

21. Fixed cost is also known as (A) total cost
(B) unavoidable cost (C) marginal cost
(D) real cost

22. The cost which changes as the level of output changes is (A) variable cost
(B) total cost (C) fixed cost
(D) marginal cost

23. The cost which does not change as the level of output changes is (A) fixed cost
(B) true cost (C) total cost (D) variable cost

24. The cost of producing per unit of output is (A) average cost (B) total cost
(C) fixed cost (D) variable cost

25. An additional cost incurred in the production of a particular commodity is
(A) total cost (B) Marginal cost
(C) fixed cost (D) variable cost

26. The ability and willingness of a consumer to pay for quantity of a commodity is (A) effective demand
(B) composite demand (C) competitive demand (D) complementary demand

27. A table which shows different quantities of a commodity bought by consumers at various prices and at a particular time is called (A) demand schedule (B) supply schedule (C) individual demand schedule (D) individual supply schedule

29. A normal demand curve has a what slope? (A) positive (C) negative
(C) positive and negative
(D) all of the above

30. The demand for money is a (A) derived demand (B) composite demand
(C) complementary demand
(D) competitive demand

31. Commodities with close substitutes have

(A) composite demand (B) competitive demand (C) complementary demand (D) derived demand

32. The ability and willingness of producers to offer quantities of a commodity for sale is
(A) demand (B) supply (C) price
(d) selling

33. A curve which results when a supply schedule is plotted in a graph is called

(A) demand curve (B) schedule curve
(C) supply curve (D) price curve

34. The normal supply curve has a
(A) negative slope (B) positive slope
(C) downward slope (D) none of the above

Use the table below to answer questions 35 – 38

Qty	F C	V C	T C	A C	M C
1	750	?	950	950	-
2	?	560	1310	?	360
3	750	900	?	550	?

35. What is fixed cost for the second quantity? (A) 750 (B) 700 (C) 600 (D) 0

36. What is the variable cost for the first quantity? (A) 200 (B) 150 (C) 250 (D) 300

37. The total cost of the third quantity is
(A) 1650 (B) 1300 (C) 900 (D) 360

38. What is the average cost for the second quantity? (A) 655 (B) 400 (C) 500 (D) 1000

39. The price which equates quantity demand and quantity supply is
(A) price stability (B) equilibrium quantity
(C) equilibrium price (D) price equality

40. Given the supply function qs = 20 + 2p, find qs when p = 10 (A) 20 units (B) 30 units (C) 40 units (D) 50 units

APPENDIX VII

RELIABILIT TEST FOR ECONOMICS ACHIEVEMENT TEST (EAT)
DESCRIPTIVES VARIABLES=ECONOMICSACHIEVEMENTTESTEAT

/STATISTICS=MEAN STDDEV VARIANCE RANGE MIN MAX SEMEAN.

Descriptives

[DataSet0]

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
STUDENTS	30	26.00	21.00	47.00	36.5000	1.23897	6.78614	46.052
Valid N (listwise)	30							

KUDER RICHARDSON 20 (KR - 20) FORMULA

$$r^2 = \frac{Kd^2 - \overline{X}(K - \overline{X})}{d^2(K - 1)}$$

Where
K = the number of items in the test
d = the standard deviation of the scores
$\overline{X}$ = the mean of the scores

K = 40, d = 6.79, $\overline{X}$=36.50

$$r^2 = \frac{40 \times 6.79^2 - 36.50(40 - 36.50)}{6.79^2(40 - 1)}$$

$$r^2 = \frac{40 \times 46.10 - 36.50 \times 3.5}{46.10 \times 39}$$

$$r^2 = \frac{1844 - 127.75}{1797.9}$$

$$r^2 = \frac{1716.25}{1797.9}$$

$$r^2 = 0.95$$

APPENDI VIII

RELIABILIT TEST FOR TEST ANXIETY INVENTORY (TAI)

```
RELIABILITY
/VARIABLES=QUES1 QUES2 QUES3 QUES4 QUES5 QUES6 QUES7 QUES8 QUES9 QUES10 QUES11
QUES12 QUES13 QUES14 QUES15 QUES1 QUES17 QUES18 QUES19 QUES20
/SCALE('TEST ANXIETY INVENTORY') ALL
/MODEL=ALPHA
/STATISTICS=DESCRIPTIVE SCALE
/SUMMARY=TOTAL.
```

Reliability

Scale: TEST ANXIETY INVENTORY

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded[a]	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.678	20

Item Statistics

	Mean	Std. Deviation	N
QUES1	4.0000	.00000	30
QUES2	3.0333	.18257	30
QUES3	4.0000	.00000	30
QUES4	4.0000	.00000	30
QUES5	3.5667	.50401	30
QUES6	3.8000	.40684	30
QUES7	3.1333	.34575	30
QUES8	3.9333	.25371	30
QUES9	3.4333	.50401	30
QUES10	3.6667	.47946	30
QUES11	4.0000	.00000	30
QUES12	3.0000	.00000	30
QUES13	4.0000	.00000	30
QUES14	4.0000	.00000	30
QUES15	3.5667	.50401	30
QUES16	3.7333	.44978	30
QUES17	3.1000	.30513	30
QUES18	3.9333	.25371	30
QUES19	3.4667	.50742	30
QUES20	3.6333	.49013	30

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
QUES1	69.0000	6.276	.000	.680
QUES2	69.9667	6.102	.155	.675
QUES3	69.0000	6.276	.000	.680
QUES4	69.0000	6.276	.000	.680
QUES5	69.4333	5.357	.285	.666
QUES6	69.2000	5.476	.333	.657
QUES7	69.8667	5.637	.316	.660
QUES8	69.0667	5.789	.346	.660
QUES9	69.5667	5.495	.223	.676
QUES10	69.3333	4.851	.566	.620
QUES11	69.0000	6.276	.000	.680
QUES12	70.0000	6.276	.000	.680
QUES13	69.0000	6.276	.000	.680
QUES14	69.0000	6.276	.000	.680
QUES15	69.4333	5.357	.285	.666
QUES16	69.2667	5.375	.335	.657
QUES17	69.9000	5.886	.200	.672
QUES18	69.0667	5.789	.346	.660
QUES19	69.5333	5.292	.311	.662
QUES20	69.3667	4.861	.544	.623

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
73.0000	6.276	2.50517	20

APPENDIX IX

LESSON PLANS FOR EXPERIMENTAL AND CONTROL GROUPS

LESSONN PLAN ON ECONOMICS WK 1

Class: SSII

Time: 45 Minutes

Topic: Theory of Cost

Specific Objectives: By the end of the lesson, students should be able to:

    a. define cost
    b. distinguish between Economist and Accountant view of cost
    c. list and explain types of costs
    d. draw various costs curves
    e. define short run cost and long run cost
    f. draw short run and long run cost curves

Entry Behaviour: The students are already familiar with terms such as cost, money etc

Set Induction: The teacher arouses the students' interest by asking them questions on previous lesson

    a. What is utility?
    b. Mention three types of utility
    c. Define marginal utility

INSTRUCTIONAL PROCEDURE

CONTENT DEVELOPMENT	TEACHER'S PERFORMANCE ACTIVITY	STUDENTS' PERFORMANCE ACTIVITY	INSTRUCTIONAL MATERIALS	INSTRUCTIONAL STRATEGIES
Step I Definition of Cost	The teacher defines cost as well as Economist and Accountant view of cost using examples and illustrations	Students listen attentively to teacher's explanations and repeat after the teacher	Lesson note	Explanation, use of Examples and Illustrations
Step II Types of Costs Total cost Average cost Marginal cost Fixed cost Variable cost etc	a. The teacher defines and gives explanations of various types of costs using examples and illustrations b. After that, he asks the students read what is on the board. c. Then, the teacher gives detailed explanations for every type of cost using examples and illustrations	a. The students look with interest to see the types of cost b. The students read what is on the board c. The students listen to the explanations and ask questions	Lesson note	Repetition, Explanations, Use of Examples and Illustrations
Step III Graphical Representations of Cost Curves	The teacher draws a graph which represents various cost curves and gives explanations on of graph	The students listen and look at the graph with interest to understand the explanations	Lesson note	Explanations
Step IV Short run and Long run Cost	The teacher defines and explains short run cost and long run cost to using examples and illustrations	The students pay attention to the explanations and ask questions concerning the graphs	Lesson note	Explanation, use of Examples and Illustrations
Step V Graphical Representations of Short run and Long run Cost Curves	The teacher draws graphs which represent short run and long run costs curves and gives explanations of the graph	a. The students listen and look at the graph with interest to understand the explanations b. The students ask questions where necessary on what the teacher has taught	Lesson note	Explanations

Evaluation: The teacher asks students the following questions to ascertain how far the specific objectives have been achieved

    a. Define cost
    b. Distinguish between Economist and Accountant view of cost
    c. List and explain any two types of cost
    d. Draw the cost curves
    e. Define short run and long run cost
    f. Draw the short run and long run costs curves

Summary/Conclusion:

The teacher collects students' workbooks, marks them and gives corrections to those who failed the questions. He encourages them to read up theory of demand in preparation for the next class

LESSONN PLAN ON ECONOMICS WK 2

Class: SSII

Time: 45 Minutes

Topic: Theory of Demand

Specific Objectives: By the end of the lesson, students should be able to:

    a. define demand
    b. explain demand schedule
    c. draw a demand curve
    d. state law of demand

Entry Behaviour: The students are already familiar with terms such as want, need etc

Set Induction: The teacher arouses the students' interest by asking them questions on previous lesson

    a. What is cost in Economics?
    b. Distinguish between Economist and Accountant view of cost
    c. Mention the types of cost

INSTRUCTIONAL PROCEDURE

CONTENT DEVELOPMENT	TEACHER'S PERFORMANCE ACTIVITY	STUDENTS' PERFORMANCE ACTIVITY	INSTRUCTIONAL MATERIALS	INSTRUCTIONAL STRATEGIES
Step I Definition of Demand	The teacher defines and explains demand using concrete examples. The teacher repeats the explanations using concrete examples	Students listen attentively to teacher's explanations	Lesson note	Explanation and Use of Examples and Illustrations
Step II Definition of Demand Schedule	a. The teacher defines demand schedule using concrete examples b. After that, he asks the students question on what he explains c. Then, the teacher lists the types of demand schedule and gives the definitions using concrete examples.	a. The students listen attentively to the explanations b. The students answer the question c. The students listen to the explanations	Lesson note	Repetition, Explanations, Use of Examples and Illustrations
Step III Demand Curve	a. The teacher defines a demand curve is using the demand schedule already explained earlier. b. The teacher explains more of the demand curve using graphical representation	a. The students listen and look at graph with much interest to understand the explanations. b. the students repeat after the teacher	Lesson note	Explanations, Use of Examples and Illustrations
Step IV Exceptional Demand Curve	The teacher gives the definition and explanations of exceptional demand curve using examples and illustrations	The students pay attention to the explanations and ask questions where necessary	Lesson note	Explanation, Use of Examples and Illustrations
Step V Law of Demand	The teacher states and gives explanations of the law of demand using examples and illustrations	The students listen to understand the explanations	Lesson note	Explanation, Use of Examples and Illustrations

Evaluation: The teacher asks students the following questions to ascertain how far the specific objectives have been achieved

    a. define demand
    b. explain demand schedule
    c. draw a demand curve
    d. explain exceptional demand curve
    e. state the law of demand

Summary/Conclusion:

The teacher collects students' workbooks, marks them and gives corrections to those who failed the questions. He encourages them to read up other aspects of theory of demand in preparation for the next class

LESSONN PLAN ON ECONOMICS WK 3

Class: SSII

Time: 45 Minutes

Topic: Theory of Demand continues Changes in Quantity Demand and Changes in Demand

Specific Objectives: By the end of the lesson, students should be able to:

    a. define changes in quantity demand
    b. explain and illustrate changes in demand
    c. list and explain factors affecting demand
    d. mention and give examples of types of demand

Entry Behaviour: The students are already familiar with terms such as demand and quantity

Set Induction: The teacher arouses the students' interest by asking them questions on previous lesson

    a. What is demand?
    b. What is a demand schedule
    c. What is a demand curve?
    d. What does the law of demand states?

INSTRUCTIONAL PROCEDURE

CONTENT DEVELOPMENT	TEACHER'S PERFORMANCE ACTIVITY	STUDENTS' PERFORMANCE ACTIVITY	INSTRUCTIONAL MATERIALS	INSTRUCTIONAL STRATEGIES
Step I Changes in Quantity Demand	a. The teacher defines changes in quantity demand using concrete examples and illustrations. The teacher repeats the explanations using concrete examples and illustrations. He then asks the students to repeat what he says b. The teacher uses graphs as an example to illustrate more on changes in quantity demand	a. Students listen attentively to teacher's explanations and repeat afterwards b. The students also ask questions on what is being taught	Lesson note	Explanation and Use of Examples and Illustrations
Step II Changes in Demand	a. The teacher defines changes in demand using concrete examples and illustrations b. After that, he asks the students question on what he explains c. The teacher uses graphs as an example to illustrate more on changes in demand	a. The students listen attentively to the explanations b. The students answer the question c. The students listen to the explanations and ask questions	Lesson note	Repetition, Explanations, Use of Examples and Illustrations
Step III Factors Affecting demand	The teacher lists and explains the factors affecting demand. Then, he asks the students to mention the factors	The students listen to the explanations and repeat afterwards	Lesson note	Explanations
Step IV Types of Demand	The teacher lists and explains the types of demand using examples and illustrations	The students pay attention to the explanations	Lesson note	Explanation, Use of Examples and Illustrations

Evaluation: The teacher asks students the following questions to ascertain how far the specific objectives have been achieved

  a. Define changes in quantity demand
  b. Explain and illustrate change in demand
  c. List and explain three factors affecting demand
  d. Mention and give examples of any two types of demand

Summary/Conclusion:

The teacher collects students' workbooks, marks them and gives corrections to those who failed the questions. He encourages them to read up theory of supply in preparation for the next class

LESSONN PLAN ON ECONOMICS WK 4

Class: SSII

Time: 45 Minutes

Topic: Theory of Supply

Specific Objectives: By the end of the lesson, students should be able to:

  a. define supply
  b. explain supply schedule
  c. draw a supply curve
  d. list the cases of exceptional supply curves
  e. state the law of supply

Entry Behaviour: The students are already familiar with term such as sellers, producers etc

Set Induction: The teacher arouses the students' interest by asking them questions on previous lesson

  a. Explain changes in quantity demand
  b. What is change in demand?
  c. List five factors affecting demand
  d. Explain any four types of demand

INSTRUCTIONAL PROCEDURE

CONTENT DEVELOPMENT	TEACHER'S PERFORMANCE ACTIVITY	STUDENTS' PERFORMANCE ACTIVITY	INSTRUCTIONAL MATERIALS	INSTRUCTIONAL STRATEGIES
Step I Definition of Supply	The teacher explains the definition of supply using concrete examples. The teacher repeats the explanations using concrete examples	Students listen attentively to teacher's explanations	Lesson note	Explanation and Use of Examples and Illustrations
Step II Definition of Supply Schedule	a. The teacher defines supply schedule using concrete examples b. After that, he asks the students questions on what he explains c. Then, the teacher lists the types of supply schedule and gives detailed explanations using concrete examples.	a. The students listen attentively to the explanations b. The students answer the question c. The students listen to the explanations	Lesson note	Repetition, Explanations, Use of Examples and Illustrations
Step III Supply Curve	a. The teacher defines a supply curve using the supply schedule already explained earlier. b. The teacher explains more of the supply curve using graphical representation	a. The students listen and look at graph with much interest to understand the explanations. b. the students repeat after the teacher	Lesson note	Explanations, Use of Examples and Illustrations
Step IV Exceptional Supply Curve	The teacher gives the definition of e-0xceptional supply curve using examples and illustrations	The students pay attention to the explanations and ask questions where necessary	Lesson note	Explanation, Use of Examples and Illustrations
Step V Law of Supply	The teacher states and defines the law of supply using examples and illustrations	The students listen to understand the explanations	Lesson note	Explanation, Use of Examples and Illustrations

Evaluation: The teacher asks students the following questions to ascertain how far the specific objectives have been achieved

    a. define supply
    b. explain supply schedule
    c. draw a supply curve
    d. list two cases of exceptional supply curve
    e. state the law of supply

Summary/Conclusion:

The teacher collects students' workbooks, marks them and gives corrections to those who failed the questions. He encourages them to read up other aspects of theory of supply in preparation for the next class

LESSONN PLAN ON ECONOMICS WK 5

Class: SSII

Time: 45 Minutes

Topic: Theory of Supply continues

Specific Objectives: By the end of the lesson, students should be able to:

    a. define changes in quantity supply
    b. illustrate changes in supply
    c. list and explain factors affecting supply
    d. mention and give examples of types of supply

Entry Behaviour: The students are already familiar with terms such as demand and quantity

Set Induction: The teacher arouses the students' interest by asking them questions on previous lesson

    a. Define supply
    b. Explain the supply schedule
    c. What is a supply curve?
    d. State the law of supply

INSTRUCTIONAL PROCEDURE

CONTENT DEVELOPMENT	TEACHER'S PERFORMANCE ACTIVITY	STUDENTS' PERFORMANCE ACTIVITY	INSTRUCTIONAL MATERIALS	INSTRUCTIONAL STRATEGIES
Step I Changes in Quantity Supply	a. The teacher defines changes in quantity supply using concrete examples and illustrations. The teacher repeats the explanations using concrete examples and illustrations. He then asks the students to repeat what he says b. The teacher uses graphs as an example to illustrate more on changes in quantity demand	a. Students listen attentively to teacher's explanations and repeat afterwards b. The students also ask questions on what is being taught	Lesson note	Explanation and Use of Examples and Illustrations
Step II Changes in Supply	a. The teacher defines changes in supply using concrete examples and illustrations b. After that, he asks the students questions on what he explains c. The teacher uses graphs as an example to illustrate more on changes in supply	a. The students listen attentively to the explanations b. The students answer the question c. The students listen to the explanations and ask questions	Lesson note	Repetition, Explanations, Use of Examples and Illustrations
Step III Factors Affecting Supply	The teacher lists and explains the factors affecting supply. Then, he asks the students to mention the factors	The students listen to the explanations and repeat afterwards	Lesson note	Explanations
Step IV Types of Supply	The teacher lists and gives explanations on the types of supply using examples and illustrations	The students pay attention to the explanations	Lesson note	Explanation, Use of Examples and Illustrations

Evaluation: The teacher asks students the following questions to ascertain how far the specific objectives have been achieved

    a. define changes in quantity supply
    b. illustrate change in supply
    c. list and explain any three factors affecting supply
    d. mention and give two examples of any types of supply

Summary/Conclusion:

The teacher collects students' workbooks, marks them and gives corrections to those who failed the questions. He encourages them to read extensively in preparation for their coming examination

At the end of this treatment session, the students in experimental group will be assessed using Computer Based Test (CBT) designed for Economics Achievement Test (EAT). Also, the students in control group will be assessed using Paper and Pencil Test (PPT) designed for Economics Achievement Test (EAT), the data obtain from this exercise will served as posttest scores for the two groups respectively.

APPENDIX X

TABLE OF SPECIFICATIONS FOR A-60 ITEM ECONOMICS ACHIEVEMENT TEST (EAT)

S/N	CONTENTS	OBJECTIVES						
		Knowledge (20%)	Comprehension (20%)	Application (20%)	Analysis (20%)	Synthesis (10%)	Evaluation (10%)	Total
1	Theory of Demand	5.2	5.2	5.2	5.2	1.6	1.6	24
2	Theory of Supply	5	5	5	5	1.5	1.5	23
3	Theory of Cost	2.8	2.8	2.8	2.8	0.9	0.9	13
	Total	**13**	**13**	**13**	**13**	**4**	**4**	**60**

APPENDIX XI

CBT TRAINING SESSION AND A SAMPLE OF CBT DESIGNED FOR THE TRAINING SESSION

On the first day of the training, the researcher established rapport and familiarized himself with the students in experimental group and control group. He then taught them extensively what Computer-Based Test (CBT) entails. In doing so, the researcher built confidence in the students to take CBT irrespective of their previous background knowledge on the use of computer.

The students were trained by the researcher on simple use of keyboard and mouse to answer questions on a computer monitor. The reason for training the experimental group and control group on how to use computer for CBT was because, the students had never been involved in CBT exam. The training focused on three key features of a computer for the CBT i.e the monitor, keyboard, and mouse. The students were taught what monitor, keyboard, and mouse entail, as well as how to use them for CBT. The researcher used CBT designed on SSI Economics as an example for students' deeper understanding of how to take CBT. During the training session, the researcher ensured that there was standby alternative power source to forestall any power outage.

On the second day which marked the end of the training, the researcher gave each student a maximum of fifteen minutes to practice what has been taught on the computer. Also, the researcher ensured that the students in experimental and control groups were trained to mastery of using CBT for exam such that the students were clarified of all the questions they asked during the practical session. The practical session built confidence in the students for CBT. The training lasted

for four days, two days for each school. The training of students in experimental group and control group took place in their respective school computer laboratories.

COMPUTER BASED TEST (CBT)
ECONOMICS ACHIEVEMENT TEST (EAT) FOR SSII
TIME: 40 MINUTES

EXAMINATION NUMBER:
SEX:

ATTEMPT ALL QUESTIONS AND SELECT THE CORRECT OPTION

1. What is the name of a person who gave most widely acceptable definition of Economics? **(A) Lionel Robbins (B) John Smith (C) Davenport (D) Alfred Marshall**

ANSWER

2. Goods and services such are cars, radios, food, houses, and books which we desire for consumption are referred to as **(A) Resources (B) Scarcity (C) Needs (D) Wants**

ANSWER:

3. The means or basic instruments with which human wants are satisfied are called **(A) Money (B) Resources (C) Scale of preference (D) Choice**

ANSWER:

4. The question of choice or method of production on the economic problems of the society is **(A) What to produce (B) For whom to produce (C) How to produce (D) Efficiency of the resources**

ANSWER:

5. The process of creating goods and services for the satisfaction of human wants referred to **(A) Creation (B) Manufacturing (C) Producing (D) Production**
ANSWER:

6. The free gift of nature explained as various natural resources found anywhere on earth is **(A)** **Crude oil** **(B)** **Land** **(C)** **Resources** **(D) Capital and Land**

ANSWER:

7. Breaking down of production process into different operations so that each operation is undertaken by a worker or group of workers is called **(A)** **Labour divisions** **(B)** **specialization** **(C)** **Division of labour** **(D) Labour classification**

ANSWER:

8. A group of firms producing similar commodities or products of offering similar services is referred to as **(A) Industry** **(B)** **Firm** **(C)** **Plant** **(D)** **Productions**

ANSWER:

9. The type of business organization owned and managed by one person who provides the capital, bears the risk, runs the business and makes profit of the business is **(A)** **Proprietorship** **(B)** **Partnership** **(C)** **Sole partnership** **(D) Sole proprietorship**

ANSWER:

10. The number of births per thousand of the population in a year is **(A)** **Death rate** **(B)** **Birth rate** **(C)** **Death birth rate** **(D)** **Birth death rate**

ANSWER:

APPENDIX XII

POST-TEST (PPT)

ECONOMICS ACHIEVEMENT TEST (EAT)

NAME OF THE SCHOOL:……………………………………………………………………

SEX: MALE ☐   FEMALE ☐   TIME: 40 MINUTES   CLASS: SSII

ATTEMPT ALL QUESTIONS AND CIRCLE THE CORRECT OPTION APPROPRIATELY

EXAMPLE: What is the name of a person who gave most widely acceptable definition of Economics? **(A)** Lionel Robbins (B) John Smith (C) Davenport (D) Alfred Marshall

1. The ability and willingness of a consumer to pay for quantity of a commodity is (A) effective demand (B) composite demand (C) competitive demand (D) complementary demand

2. A table which shows different quantities of a commodity bought by consumers at various prices and at a particular time is called (A) demand schedule (B) supply schedule (C) individual demand schedule (D) individual supply schedule

3. A normal demand curve has a what slope? (A) positive   (B) negative (C) positive and negative   (D) all of the above

4. The demand for money is a (A) derived demand   (B) composite demand (C) complementary demand (D) competitive demand

5. Commodities with close substitutes have (A) composite demand   (B) competitive demand   (C) complementary demand (D) derived demand

6. The ability and willingness of producers to offer quantities of a commodity for sale is (A) demand   (B) supply   (C) price (D) selling

Use the table below to answer questions 35 – 38

Qty	F C	V C	T C	A C	M C
1	750	?	950	950	-
2	?	560	1310	?	360
3	750	900	?	550	?

7. What is fixed cost for the second quantity? (A) 750 (B) 700 (C) 600 (D) 0

8. What is the variable cost for the first quantity? (A) 200 (B) 150 (C) 250 (D) 300

9. The total cost of the third quantity is (A) 1650 (B) 1300 (C) 900 (D) 360

10. What is the average cost for the second quantity? (A) 655 (B) 400 (C) 500 (D) 1000

11. The price which equates quantity demand and quantity supply is

(A) price stability (B) equilibrium quantity (C) equilibrium price (D) price equality

12. Given the supply function qs = 20 + 2p, find qs when p = 10 (A) 20 units (B) 30 units (C) 40 units (D) 50 units

13. Fixed cost is also known as (A) total cost (B) unavoidable cost (C) marginal cost (D) real cost

14. The cost which changes as the level of output changes is (A) variable cost (B) total cost (C) fixed cost (D) marginal cost

15. The cost which does not change as the level of output changes is (A) fixed cost (B) true cost (C) total cost (D) variable cost

16. The cost of producing per unit of output is (A) average cost   (B) total cost (C) fixed cost   (D) variable cost

17. An additional cost incurred in the production of a particular commodity is (A) total cost (B) Marginal cost   (C) fixed cost   (D) variable cost

18. A curve which results when a supply schedule is plotted in a graph is called (A) demand curve   (B) schedule curve (C) supply curve   (D) price curve

19. The normal supply curve has a (A) negative slope   (B) positive slope (C) downward slope   (D) none of the above

20. Demand for a commodity by a consumer is the quantity of that commodity that the consumer (A) demands at a given price at a point in time   (B) demands at a given price   (C) actually digests   (D) produces, given its price

21. Let TC= Total costs, TVC= Total variable costs, TFC= Total fixed costs, ATC= Average total costs, AVC= Average variable costs, AFC= Average fixed costs. Then, which of the following is NOT true? (A) TC= TFC+TVC (B) ATC= AVC+AFC (C) AFC= TFC/Q   (D) TVC= AVC/Q

22. Which of these is a sacrifice made in order to satisfying any want? (A) variable cost (B) opportunity cost (C) total cost   (D) prime cost

23. Total fixed cost measures the cost of (A) all plant and machinery   (B) all assets where quantity cannot be varied in the short run   (C) all assets upon which the firm has control   (D) property owned by the firm

24. Inferior goods are defined in Economics as goods (A) whose quality is low (B) consumed by very poor people   (C) whose consumption falls when consumer income rises (D) which satisfy only basic needs

25. If two commodities are good substitutes for one another, e.g butter and margarine, an increase in the demand for one will reduce the demand for the other. This type of demand is called (A) composite demand (B) joint demand (C) derived demand (D) competitive demand

25. If there is an increase in demand without a corresponding increase in supply, there will be a (A) rise in price (B) shift in demand curve to the left (C) fall in price (D) shift in supply curve to the right

27. Given that TC= TFC + TVC and TR = AR x Q, profit is equal to (A) (AR+Q) – TFC (B) (TFC + TVC)/Q (C) (AR x Q) – TC   (D) (TC x Q)/AR

28. Given a market demand curve Q = 120 – 2p and supply curve Q = 4p, the equilibrium price and quantity respectively are (A) 20 and 80   (B) 30 and 120   (C) 40 and 60   (D) 60 and 240

29. Given that the total fixed cost is N1000, total variable cost N2500 and the output, 100 units. Find the average cost of producing one unit (A) N60 (B) N45 (C) N35   (D) N30

30. Which of the following falls continuously as output expands?
(A) average fixed cost   (B) marginal cost
(C) average variable cost   (D) average cost

31. Economists view cost as (A) real cost (B) true cost   (C) opportunity cost (D) all of the above

32. Accountants view cost as (A) forgone alternative   (B) real cost   (C) true cost (D) money cost

33. When the demand curve shifts to the right, it indicates that a larger quantity is demanded at each price. This is caused by one of the following (A) a fall in the price (B) a fall in income   (C) a rise in the price of a complement   (D) none of the above

34. The quantity supplied of a commodity increases when (A) production increases (B) demand increases (C) price of the commodity increases (D) population of the country increases

35. If a price of a commodity falls and the quantity purchased of it does not rise, the commodity can be described as (A) normal (B) abnormal   (C) inferior   (D) superior

36. A movement along a given demand curve for a good is caused by a change in (A) consumer income   (B) the price of the good   (C) taste   (D) population

37. If AC= Average Cost, TC= Total Cost, VC= Variable Cost of production, FC= Fixed Cost, Q=quantity of goods, then the formulae of AC and TC are
(A) AC= TC/Q; TC=VC+FC (B) AC= (TC)Q; TC=VC+FC (C) AC= TC/Q; TC= (VC)(FC) (D) AC= TC – FC; VC= TC – AC

Unit of output	Total cost
1	20
2	32
3	42
4	48
5	50

Use the above table to answer questions   38 – 39
38. In the above table, the marginal cost of the 3rd unit of output is (A) 12 (B)   6 (C) 10   (D) 2

39. What is the marginal cost of the 2nd output? (A) 12   (B) 6   (C) 10   (D) 2

40. Which of the following is NOT a determinant of changes in supply?
(A) Changes in the cost of production
(B) technical progress (C) changes in price
(D) weather

APPENDIX XIII

POST TEST (CBT)

COMPUTER BASED TEST (CBT)
ECONOMICS ACHIEVEMENT TEST (EAT) FOR SSII

TIME: 40 MINUTES

SEX:

ATTEMPT ALL QUESTIONS AND SELECT THE CORRECT OPTION

EXAMPLE: What is the name of a person who gave most widely acceptable definition of Economics?   **(A)   Lionel Robbins   (B)   John Smith (C) Davenport   (D) Alfred Marshall**

ANSWER: A

1. The ability and willingness of a consumer to pay for quantity of a commodity is **(A) effective demand   (B) composite demand   (C) competitive demand (D)   complementary demand**

ANSWER:

2. A table which shows different quantities of a commodity bought by consumers at various prices and at a particular time is called **(A) demand schedule (B) supply schedule (C) individual demand schedule (D) individual supply schedule**

ANSWER:

3. A normal demand curve has a what slope? **(A) positive   (C) negative (D) positive and negative   (D) all of the above**

ANSWER:

4. The demand for money is a **(A) derived demand** **(B) composite demand** **(C) complementary demand** **(D) competitive demand**

ANSWER:

5. Commodities with close substitutes have

(A) composite demand **(B) competitive demand** **(C) complementary demand** **(D) derived demand**

ANSWER:

6. The ability and willingness of producers to offer quantities of a commodity for sale is **(A) demand** **(B) supply** **(C) price** **(D) selling**

ANSWER:

Use the table below to answer questions 35 – 38

Qty	F C	V C	T C	A C	M C
1	750	?	950	950	-
2	?	560	1310	?	360
3	750	900	?	550	?

7. What is fixed cost for the second quantity? **(A) 750 (B) 700 (C) 600 (D) 0**

ANSWER:

8. What is the variable cost for the first quantity? **(A) 200 (B) 150 (C) 250 (D) 300**

ANSWER:

9. The total cost of the third quantity is **(A) 1650 (B) 1300 (C) 900 (D) 360**

ANSWER:

10. What is the average cost for the second quantity? **(A) 655 (B) 400 (C) 500 (D) 1000**

ANSWER:

11. The price which equates quantity demand and quantity supply is **(A) price stability (B) equilibrium quantity (C) equilibrium price (D) price equality**

ANSWER:

12. Given the supply function qs = 20 + 2p, find qs when p = 10 **(A) 20 units**

(B) 30 units (C) 40 units (D) 50 units

ANSWER:

13. Fixed cost is also known as **(A) total cost (B) unavoidable cost**

(C) marginal cost (D) real cost

ANSWER:

14. The cost which changes as the level of output changes is **(A) variable cost (B) total cost (C) fixed cost (D) marginal cost**

ANSWER:

15. The cost which does not change as the level of output changes is **(A) fixed cost (B) true cost (C) total cost (D) variable cost**

ANSWER:

16. The cost of producing per unit of output is **(A) average cost   (B) total cost (C) fixed cost   (D) variable cost**

ANSWER:

17. An additional cost incurred in the production of a particular commodity is **(A) total cost (B) Marginal cost   (C) fixed cost (D) variable cost**

ANSWER:

18. A curve which results when a supply schedule is plotted in a graph is called **(A) demand curve   (B) schedule curve   (C) supply curve   (D) price curve**

ANSWER:

19. The normal supply curve has a   **(A) negative slope   (B) positive slope (C) downward slope   (D) none of the above**

ANSWER:

20. Demand for a commodity by a consumer is the quantity of that commodity that the consumer **(A) demands at a given price at a point in time   (B) demands at a given price   (C) actually digests   (D) produces, given its price**

ANSWER:

21. Let TC= Total costs, TVC= Total variable costs, TFC= Total fixed costs, ATC= Average total costs, AVC= Average variable costs, AFC= Average fixed costs. Then, which of the following is NOT true? **(A) TC= TFC+TVC**

(B) ATC= AVC+AFC   (C) AFC= TFC/Q   (D) TVC= AVC/Q

ANSWER:

22. Which of these is a sacrifice made in order to satisfying any want? **(A) variable cost (B) opportunity cost   (C) total cost   (D) prime cost**

ANSWER:

23. Total fixed cost measures the cost of   **(A) all plant and machinery   (B) all assets where quantity cannot be varied in the short run   (C) all assets upon which the firm has control   (D) property owned by the firm**

ANSWER:

24. Inferior goods are defined in Economics as goods **(A) whose quality is low (B) consumed by very poor people   (C) whose consumption falls when consumer income rises (D) which satisfy only basic needs**

ANSWER:

25. If two commodities are good substitutes for one another, e.g butter and margarine, an increase in the demand for one will reduce the demand for the other. This type of demand is called **(A) composite demand   (B) joint demand (C) derived demand (D) competitive demand**

ANSWER:

25. If there is an increase in demand without a corresponding increase in supply, there will be a **(A) rise in price (B) shift in demand curve to the left (C) fall in price   (D) shift in supply curve to the right**

ANSWER:

27. Given that TC= TFC + TVC and TR = AR x Q, profit is equal to **(A) (AR+Q) – TFC (B) (TFC + TVC)/Q   (D) (AR x Q) – TC   (D) (TC x Q)/AR**

ANSWER:

28. Given a market demand curve Q = 120 – 2p and supply curve Q = 4p, the equilibrium price and quantity respectively are **(A) 20 and 80   (B) 30 and 120 (C) 40 and 60   (D) 60 and 240**

ANSWER:

29. Given that the total fixed cost is N1000, total variable cost N2500 and the output, 100 units. Find the average cost of producing one unit **(A) N60 (B) N45 (C) N35   (D) N30**

ANSWER:

30. Which of the following falls continuously as output expands? **(A) average fixed cost   (B) marginal cost (C) average variable cost (D) average cost**

ANSWER:

31. Economists view cost as **(A) real cost**   **(B) true cost**   **(C) opportunity cost** **(D) all of the above**

ANSWER:

32. Accountants view cost as **(A) forgone alternative**   **(B) real cost**   **(C) true cost**   **(D) money cost**

ANSWER:

33. When the demand curve shifts to the right, it indicates that a larger quantity is demanded at each price. This is caused by one of the following **(A) a fall in the price** **(B) a fall in income**   **(C) a rise in the price of a complement**   **(D) none of the above**

ANSWER:

34. The quantity supplied of a commodity increases when **(A) production increases**   **(B) demand increases**   **(C) price of the commodity increases** **(D) population of the country increases**

ANSWER:

35. If a price of a commodity falls and the quantity purchased of it does not rise, the commodity can be described as **(A) normal**   **(B) abnormal**   **(C) inferior** **(D) superior**

ANSWER:

36. A movement along a given demand curve for a good is caused by a change in **(A) consumer income**   **(B) the price of the good**   **(C) taste**   **(D) population**

ANSWER:

37. If AC= Average Cost, TC= Total Cost, VC= Variable Cost of production, FC= Fixed Cost, Q=quantity of goods, then the formulae of AC and TC are

(A) AC= TC/Q; TC=VC+FC (B) AC= (TC)Q; TC=VC+FC (C) AC= TC/Q; TC= (VC)(FC) (D) AC= TC – FC; VC= TC – AC

ANSWER:

Unit of output	Total cost
1	20
2	32
3	42
4	48
5	50

Use the above table to answer questions   38 – 39

38. In the above table, the marginal cost of the 3rd unit of output is   (A) 12 (B) 6 (C) 10 (D) 2

ANSWER:

39. What is the marginal cost of the 2nd output? (A) 12   (B) 6   (C) 10 (D) 2

ANSWER:

40. Which of the following is NOT a determinant of changes in supply? (A) Changes in the cost of production   (B) technical progress (C) changes in price (D) weather

ANSWER:

APPENDIX XIV

PRE-TEST AND POST-TEST SCORES OF EAT

(EXPERIMENTAL GROUP)

S/N	EXAM NO	SEX	PRE-TEST (PPT)		POST-TEST (CBT)	
			EAT	TAI	EAT	TAI
1	053	F	24	58	22	55
2	011	F	26	33	26	31
3	022	M	23	36	26	20
4	045	F	25	02	21	40
5	004	F	22	28	22	29
6	030	F	19	34	19	33
7	005	M	18	45	18	48
8	021	M	25	37	16	31
9	058	F	19	54	21	60
10	044	F	21	33	26	42
11	027	M	20	32	17	33
12	006	F	13	43	13	44
13	023	M	21	36	24	29
14	007	M	09	13	14	18
15	020	M	18	04	15	41
16	001	F	16	02	17	37
17	040	M	31	45	25	52
18	010	M	30	35	30	39
19	003	F	25	31	24	30
20	002	M	23	59	20	50
21	062	F	21	64	18	57
22	065	M	12	66	18	48
23	061	F	24	26	23	33
24	054	M	23	37	16	42
25	059	F	25	41	24	45
26	034	M	22	25	20	24
27	060	M	21	48	32	48
28	057	F	26	36	24	58
29	048	M	26	50	19	36
30	051	F	21	52	20	52

PRE-TEST AND POST-TEST SCORES OF EAT

(EXPERIMENTAL GROUP)

S/N	EXAM NO	SEX	PRE-TEST (PPT)		POST-TEST (CBT)	
			EAT	TAI	EAT	TAI
31	047	F	22	46	15	38
32	050	F	15	46	13	44
33	067	M	34	29	31	35
34	066	F	27	58	24	54
35	063	F	23	44	20	38
36	064	F	18	41	26	42
37	052	F	22	61	19	61
38	056	M	20	41	18	36
39	012	F	21	40	18	58
40	038	F	21	35	18	39
41	031	M	23	39	25	34
42	033	F	22	34	21	30
43	008	M	25	42	23	46
44	029	F	16	42	18	51
45	036	F	14	52	18	39
46	016	M	20	41	21	40
47	024	F	24	48	21	39
48	018	M	22	30	20	39
49	013	M	21	45	22	45
50	009	M	22	49	15	36
51	043	F	17	53	19	40
52	049	M	25	41	16	48
53	055	M	22	33	20	17
54	014	F	27	57	23	45
55	037	M	22	34	21	40
56	035	F	22	43	23	39

APPENDIX XV

PRE-TEST AND POST-TEST SCORES OF EAT

(CONTROL GROUP)

S/N	EXAM NO	SEX	PRE-TEST (PPT)		POST-TEST (PPT)	
			EAT	TAI	EAT	TAI
1	032	F	17	40	20	45
2	011	M	29	30	29	34
3	055	M	24	33	24	29
4	029	M	32	33	30	50
5	041	M	22	29	22	23
6	035	M	27	47	23	40
7	010	F	14	42	21	46
8	048	F	19	46	24	46
9	066	F	13	35	12	38
10	043	M	19	41	21	49
11	061	M	22	61	17	67
12	045	F	22	42	24	48
13	014	F	16	35	14	32
14	036	F	21	45	16	47
15	067	F	18	41	21	37
16	038	F	17	51	17	48
17	056	M	24	51	24	45
18	019	F	14	33	23	45
19	022	M	18	47	23	48
20	047	M	24	48	20	46
21	020	M	22	56	17	38
22	046	M	30	37	28	28
23	031	M	30	48	25	34
24	028	M	27	47	27	33
25	051	M	23	54	17	33
26	044	M	28	38	25	37
27	068	M	22	54	21	37
28	049	M	17	41	25	38
29	039	M	21	40	18	28
30	065	M	28	51	25	49

PRE-TEST AND POST-TEST SCORES OF EAT

(CONTROL GROUP)

S/N	EXAM NO	SEX	PRE-TEST (PPT)		POST-TEST (PPT)	
			EAT	TAI	EAT	TAI
31	057	M	29	56	28	54
32	063	F	17	41	17	45
33	008	F	13	37	23	56
34	054	F	15	37	26	35
35	050	F	19	22	17	27
36	058	F	14	51	19	67
37	037	F	24	45	19	43
38	040	F	18	47	13	55
39	060	F	31	30	32	37
40	012	F	18	44	22	44
41	064	F	27	46	25	31
42	034	F	20	39	24	41
43	017	F	16	47	20	44
44	030	F	22	57	22	54
45	015	F	19	38	21	42
46	033	F	21	44	26	43
47	013	F	25	68	26	33
48	021	M	26	38	28	33
49	062	F	16	44	20	46
50	059	F	26	27	23	38
51	069	M	12	32	21	43

APPENDIX XVI

SPSS OUTPUT OF DESCRIPTIVE STATISTICS FOR THE RESEARCH QUESTIONS

```
DESCRIPTIVES VARIABLES=VAR00001 VAR00002 VAR00003 VAR00004
  /STATISTICS=MEAN STDDEV MIN MAX.
```

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest Achievement score	107	9.00	34.00	21.5327	4.86675
Pretest Test Anxiety score	107	2.00	68.00	41.2617	11.80209
Posttest Achievement score	107	12.00	32.00	21.3364	4.32183
Posttest Test Anxiety score	107	17.00	67.00	41.1869	9.72269
Valid N (listwise)	107				

```
SORT CASES  BY Groups.
SPLIT FILE SEPARATE BY Groups.
DESCRIPTIVES VARIABLES=VAR00001 VAR00002 VAR00003 VAR00004
  /STATISTICS=MEAN STDDEV MIN MAX.
```

Groups = Experimental

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest Achievement score	56	9.00	34.00	21.7143	4.47097
Pretest Test Anxiety score	56	2.00	66.00	39.8036	13.72512
Posttest Achievement score	56	13.00	32.00	20.6786	4.21731
Posttest Test Anxiety score	56	17.00	61.00	40.6786	10.13205
Valid N (listwise)	56				

a. Groups = Experimental

Groups = Control

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest Achievement score	51	12.00	32.00	21.3333	5.30534
Pretest Test Anxiety score	51	22.00	68.00	42.8627	9.11487
Posttest Achievement score	51	12.00	32.00	22.0588	4.36079
Posttest Test Anxiety score	51	23.00	67.00	41.7451	9.32061
Valid N (listwise)	51				

a. Groups = Control

```
SORT CASES  BY Gender.
SPLIT FILE SEPARATE BY Gender.
DESCRIPTIVES VARIABLES=VAR00001 VAR00002 VAR00003 VAR00004
  /STATISTICS=MEAN STDDEV MIN MAX.
```

Gender = Control and Experimental = Male

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest Achievement score	49	9.00	34.00	23.1429	5.03322
Pretest Test Anxiety score	49	4.00	66.00	40.8980	11.44233
Posttest Achievement score	49	14.00	32.00	22.0408	4.66351
Posttest Test Anxiety score	49	17.00	67.00	38.5918	9.96226
Valid N (listwise)	49				

a. Gender = Male

Gender = Control and Experimental = Female

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest Achievement score	58	13.00	31.00	20.1724	4.31293
Pretest Test Anxiety score	58	2.00	68.00	41.5690	12.18874
Posttest Achievement score	58	12.00	32.00	20.7414	3.95395
Posttest Test Anxiety score	58	27.00	67.00	43.3793	9.02983
Valid N (listwise)	58				

a. Gender = Female

```
DESCRIPTIVES VARIABLES=VAR00001 VAR00002 VAR00003 VAR00004
  /STATISTICS=MEAN STDDEV MIN MAX.
```

Gender = Experimental = Male

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest Achievement score	26	9.00	34.00	22.2308	5.10143
Pretest Test Anxiety score	26	4.00	66.00	38.1538	12.60378
Posttest Achievement score	26	14.00	32.00	20.8462	4.97749
Posttest Test Anxiety score	26	17.00	52.00	37.5000	9.86813
Valid N (listwise)	26				

a. Gender = Male

Gender = Experimental = Female

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest Achievement score	30	13.00	27.00	21.2667	3.87684
Pretest Test Anxiety score	30	2.00	64.00	41.2333	14.68915
Posttest Achievement score	30	13.00	26.00	20.5333	3.51090
Posttest Test Anxiety score	30	29.00	61.00	43.4333	9.68712
Valid N (listwise)	30				

a. Gender = Female

```
DATASET ACTIVATE DataSet2.
SORT CASES  BY VAR00002.
SPLIT FILE SEPARATE BY VAR00002.
DESCRIPTIVES VARIABLES=VAR00003 VAR00004 VAR00005 VAR00006
  /STATISTICS=MEAN STDDEV MIN MAX.
```

Gender = Control = Male

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest Achievement score	23	12.00	32.00	24.1739	4.85847
Pretest Test Anxiety score	23	29.00	61.00	44.0000	9.28342
Posttest Achievement score	23	17.00	30.00	23.3913	3.96277
Posttest Test Anxiety score	23	23.00	67.00	39.8261	10.14285
Valid N (listwise)	23				

a. Gender = Male

Gender = Control = Female

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest Achievement score	28	13.00	31.00	19.0000	4.51335
Pretest Test Anxiety score	28	22.00	68.00	41.9286	9.03462
Posttest Achievement score	28	12.00	32.00	20.9643	4.43456
Posttest Test Anxiety score	28	27.00	67.00	43.3214	8.44614
Valid N (listwise)	28				

a. Gender = Female

APPENDIX XVII

SPSS OUTPUT OF TEST OF HYPOTHESES USING ANCOVA

Hypothesis One

Univariate Analysis of Variance

Between-Subjects Factors

		Value Label	N
Groups	1.00	Experimental	56
	2.00	Control	51
Gender	1.00	Male	49
	2.00	Female	58

Tests of Between-Subjects Effects

Dependent Variable: Posttest Achievement score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	759.512[a]	4	189.878	15.870	.000
Intercept	413.517	1	413.517	34.562	.000
Groups	65.755	1	65.755	5.496	.021
Gender	2.038	1	2.038	.170	.681
Pretest	632.918	1	632.918	52.900	.000
Groups * Gender	.175	1	.175	.015	.904
Error	1220.375	102	11.964		
Total	50691.000	107			
Corrected Total	1979.888	106			

a. R Squared = .384 (Adjusted R Squared = .359)

Hypothesis Two

Univariate Analysis of Variance

Between-Subjects Factors

		Value Label	N
Groups	1.00	Experimental	56
	2.00	Control	51
Gender	1.00	Male	49
	2.00	Female	58

Tests of Between-Subjects Effects

Dependent Variable: Posttest Achievement score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	759.512[a]	4	189.878	15.870	.000
Intercept	413.517	1	413.517	34.562	.000
Groups	65.755	1	65.755	5.496	.021
Gender	2.038	1	2.038	.170	.681
Pretest	632.918	1	632.918	52.900	.000
Groups * Gender	.175	1	.175	.015	.904
Error	1220.375	102	11.964		
Total	50691.000	107			
Corrected Total	1979.888	106			

a. R Squared = .384 (Adjusted R Squared = .359)

Hypothesis Three
Univariate Analysis of Variance

Between-Subjects Factors

		Value Label	N
Gender	1.00	Male	26
	2.00	Female	30

Tests of Between-Subjects Effects

Dependent Variable: Posttest Achievement score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	355.915[a]	2	177.957	15.156	.000
Intercept	150.720	1	150.720	12.837	.001
VAR00001	354.552	1	354.552	30.196	.000
Gender	.779	1	.779	.066	.798
Error	622.299	53	11.741		
Total	24924.000	56			
Corrected Total	978.214	55			

a. R Squared = .364 (Adjusted R Squared = .340)

```
DATASET ACTIVATE DataSet1.
UNIANOVA VAR00005 BY VAR00002 WITH VAR00003
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /CRITERIA=ALPHA(0.05)
  /DESIGN=VAR00002 VAR00003.
```

Hypothesis Four

Univariate Analysis of Variance

Between-Subjects Factors

		Value Label	N
Gender	1.00	Male	23
	2.00	Female	28

Tests of Between-Subjects Effects

Dependent Variable: Posttest Achievement score

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	354.642[a]	2	177.321	14.277	.000
Intercept	271.720	1	271.720	21.877	.000
VAR00002	.472	1	.472	.038	.846
VAR00003	280.262	1	280.262	22.565	.000
Error	596.181	48	12.420		
Total	25767.000	51			
Corrected Total	950.824	50			

a. R Squared = .373 (Adjusted R Squared = .347)

Hypothesis Five

Univariate Analysis of Variance

Between-Subjects Factors

		Value Label	N
Groups	1.00	Experimental	56
	2.00	Control	51
Gender	1.00	Male	49
	2.00	Female	58

Tests of Between-Subjects Effects

Dependent Variable: Posttest Achievement score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	759.512[a]	4	189.878	15.870	.000
Intercept	413.517	1	413.517	34.562	.000
Groups	65.755	1	65.755	5.496	.021
Gender	2.038	1	2.038	.170	.681
Pretest	632.918	1	632.918	52.900	.000
Groups * Gender	.175	1	.175	.015	.904
Error	1220.375	102	11.964		
Total	50691.000	107			
Corrected Total	1979.888	106			

a. R Squared = .384 (Adjusted R Squared = .359)

Hypothesis Six

Univariate Analysis of Variance

Between-Subjects Factors

		Value Label	N
Groups	1.00	Experimental	56
	2.00	Control	51
Gender	1.00	Male	49
	2.00	Female	58

Tests of Between-Subjects Effects

Dependent Variable: Posttest Test Anxiety score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3011.906[a]	4	752.977	10.959	.000
Intercept	4601.251	1	4601.251	66.967	.000
Groups	1.187	1	1.187	.017	.896
Gender	538.790	1	538.790	7.842	.006
Pretest2	2336.923	1	2336.923	34.012	.000
Groups * Gender	.838	1	.838	.012	.912
Error	7008.355	102	68.709		
Total	191531.000	107			
Corrected Total	10020.262	106			

a. R Squared = .301 (Adjusted R Squared = .273)

Hypothesis Seven

Univariate Analysis of Variance

Between-Subjects Factors

		Value Label	N
Groups	1.00	Experimental	56
	2.00	Control	51
Gender	1.00	Male	49
	2.00	Female	58

Tests of Between-Subjects Effects

Dependent Variable: Posttest Test Anxiety score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3011.906[a]	4	752.977	10.959	.000
Intercept	4601.251	1	4601.251	66.967	.000
Groups	1.187	1	1.187	.017	.896
Gender	538.790	1	538.790	7.842	.006
Pretest2	2336.923	1	2336.923	34.012	.000
Groups * Gender	.838	1	.838	.012	.912
Error	7008.355	102	68.709		
Total	191531.000	107			
Corrected Total	10020.262	106			

a. R Squared = .301 (Adjusted R Squared = .273)

```
UNIANOVA VAR00004 BY Gender WITH VAR00002
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /CRITERIA=ALPHA(0.05)
  /DESIGN=VAR00002 Gender.
```

Hypothesis Eight

Univariate Analysis of Variance

Between-Subjects Factors

		Value Label	N
Gender	1.00	Male	26
	2.00	Female	30

Tests of Between-Subjects Effects

Dependent Variable: Posttest Test Anxiety score

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	2004.886[a]	2	1002.443	14.591	.000
Intercept	3690.341	1	3690.341	53.713	.000
VAR00002	1514.538	1	1514.538	22.044	.000
Gender	310.043	1	310.043	4.513	.038
Error	3641.329	53	68.704		
Total	98312.000	56			
Corrected Total	5646.214	55			

a. R Squared = .355 (Adjusted R Squared = .331)

```
UNIANOVA VAR00006 BY VAR00002 WITH VAR00004
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /CRITERIA=ALPHA(0.05)
  /DESIGN=VAR00004 VAR00002.
```

Hypothesis Nine

Univariate Analysis of Variance

Between-Subjects Factors

		Value Label	N
Gender	1.00	Male	23
	2.00	Female	28

Tests of Between-Subjects Effects

Dependent Variable: Posttest Test Anxiety score

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	989.640[a]	2	494.820	7.081	.002
Intercept	1046.619	1	1046.619	14.978	.000
VAR00004	835.365	1	835.365	11.955	.001
VAR00002	244.621	1	244.621	3.501	.067
Error	3354.046	48	69.876		
Total	93219.000	51			
Corrected Total	4343.686	50			

a. R Squared = .228 (Adjusted R Squared = .196)

Hypothesis Ten

Univariate Analysis of Variance

Between-Subjects Factors

		Value Label	N
Groups	1.00	Experimental	56
	2.00	Control	51
Gender	1.00	Male	49
	2.00	Female	58

Tests of Between-Subjects Effects

Dependent Variable: Posttest Test Anxiety score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3011.906^a	4	752.977	10.959	.000
Intercept	4601.251	1	4601.251	66.967	.000
Groups	1.187	1	1.187	.017	.896
Gender	538.790	1	538.790	7.842	.006
Pretest2	2336.923	1	2336.923	34.012	.000
Groups * Gender	.838	1	.838	.012	.912
Error	7008.355	102	68.709		
Total	191531.000	107			
Corrected Total	10020.262	106			

a. R Squared = .301 (Adjusted R Squared = .273)

APPENDIX XVIII

Three-Year Results in Twenty-two (22) Popular Subjects in the May/June 2004-2006 WASSCE in Nigeria

Subject	% of Passes at Credit Level (Grades 1 - 6)			% of Failure		
	2004	2005	2006	2004	2005	2006
Commerce	36.66	47.81	56.77	35.38	30.33	24.81
Financial Accounting	23.14	24.81	18.47	46.20	41.98	48.90
Christian Religious Knowle	32.30	46.48	36.45	35.26	23.58	33.45
Economics	37.59	36.24	49.45	22.26	20.20	15.71
Geography	18.98	28.62	45.84	47.31	44.17	29.29
Government	62.14	60.88	67.82	16.31	20.48	13.62
History	41.71	29.97	31.30	36.08	43.04	41.24
Islamic Studies	19.56	17.73	51.53	42.92	49.89	24.02
English Language	29.59	25.63	32.48	37.61	36.93	29.65
French	42.82	33.36	51.55	45.84	30.66	22.57
Hausa Language	43.04	42.85	33.96	24.95	20.70	30.96
Igbo Language	55.53	50.26	34.52	13.73	17.09	37.93
Yoruba Language	36.21	18.97	34.40	36.62	66.41	46.07
Further Mathematics	23.99	29.57	43.69	37.40	38.05	27.15
General Mathematics	33.97	38.20	41.12	34.47	34.41	24.95
Agricultural Science	23.48	15.51	35.01	43.87	53.46	35.42
Biology	29.68	35.74	49.23	34.68	32.18	22.96
Chemistry	37.86	50.94	44.90	32.76	27.28	30.11
Physics	49.40	41.50	58.06	19.26	25.88	16.52
Technical Drawing	49.43	46.01	31.86	21.16	23.85	39.14
Foods & Nutrition	54.74	58.08	61.47	12.15	14.04	7.93
Literature-In-English	14.31	18.68	32.20	43.49	41.67	24.99

Source: Statistics on West African Senior School Certificate Examination (WASSCE) conducted in Nigeria. CEE/MAB/mab*WAEC HEADQUARTERS ACCRA, 2008
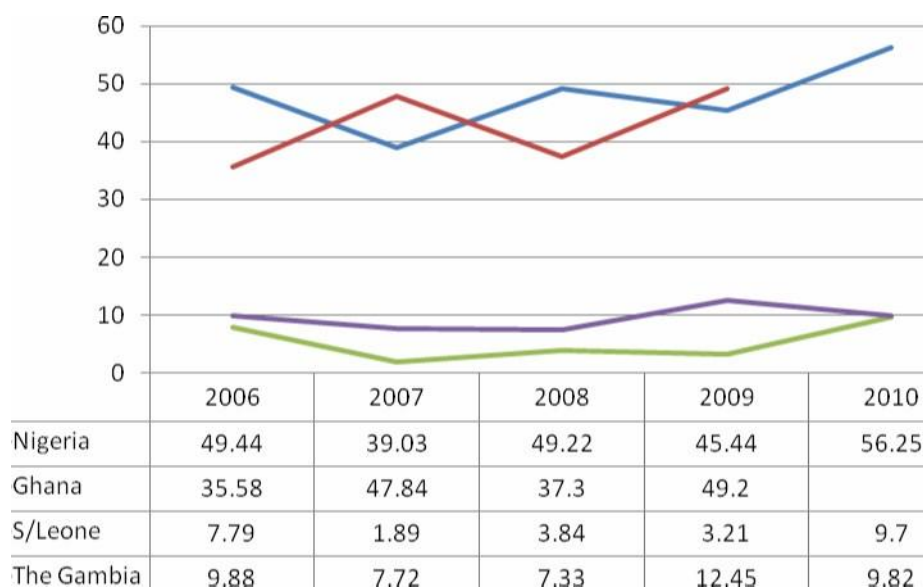
APPENDIX XIX
3-Year Results in Seventeen (17) Popular Subjects in the
November/December 2004 - 2006 WASSCE in Nigeria

Subjects	% of Passes at Credit Level (Grades A1-C6)			% of Failure		
	2004	**2005**	**2006**	**2004**	**2005**	**2006**
Commerce	45.55%	44.96%	47.17%	34.24%	29.48%	27.47%
Financial Accounting	43.35%	42.11%	35.38%	24.97%	28.42%	29.18%
C. R. K.	45.65%	33.31%	49.67%	25.46%	32.57%	19.70%
Economics	44.48%	37.37%	40.41%	21.29%	28.41%	24.37%
Government	69.96%	66.12%	58.41%	8.07%	9.45%	12.04%
History	33.44%	42.17%	26.77%	46.62%	35.68%	48.39%
Islamic Studies	26.20%	34.23%	50.49%	39.06%	36.67%	21.50%
French	47.00%	46.43%	51.56%	38.12%	30.22%	34.61%
English Language	40.82%	29.58%	26.34%	22.27%	26.39%	28.16%
Igbo Language	45.90%	52.67%	35.50%	34.84%	26.68%	31.93%
Hausa Language	44.77%	57.62%	34.01%	27.39%	19.88%	33.54%
Yoruba Language	26.26%	27.71%	23.52%	38.36%	36.11%	54.54%
General Mathematics	55.75%	37.63%	46.06%	20.08%	26.27%	17.29%
Agricultural Science	29.02%	28.97%	36.30%	38.17%	41.99%	33.44%
Biology	41.81%	37.30%	43.90%	28.79%	30.10%	23.56%
Chemistry	38.17%	36.43%	40.36%	33.82%	32.55%	29.21%
Physics	37.91%	31.73%	46.89%	30.74%	34.58%	23.58%

Source: Statistics on West African Senior School Certificate Examination (WASSCE) conducted in Nigeria.
CEE/MAB/mab*WAEC HEADQUARTERS ACCRA, 2008

APPENDIX XX

Trends of Candidates' Performance in May /June 2006 to 2010 WASSCE in Economics

	2006	2007	2008	2009	2010
Nigeria	49.44	39.03	49.22	45.44	56.25
Ghana	35.58	47.84	37.3	49.2	
S/Leone	7.79	1.89	3.84	3.21	9.7
The Gambia	9.88	7.72	7.33	12.45	9.82

Source: An appraisal of candidates achievement in the West African Senior School Certificate Examination (WASSCE) among WAEC member countries by Mulika, A. Bello (Alhaja, Mrs), Registrar/CEO WAEC HQ Accra and Dr (Mrs) Oke, Deputy Resgistrar, WAEC HQ, Lagos

The statistics shows that less than 57% of the candidates had credit and above (A1 – C6) in Economics in all the countries during the period under consideration. The trend of performance fluctuated in all the countries throughout the period.