EFFECTS OF DECLARATIVE AND ENHANCED-DECLARATIVE KNOWLEDGE APPROACHES ON STUDENTS' LEARNING OUTCOMES IN QUANTITATIVE ECONOMICS CONTENTS IN SENIOR SECONDARY SCHOOLS IN OYO TOWN

BY

David Oluwaseyi, OLADIMEJI
Matric No.: 152657
B.Ed Educational Management (UNAD), M.Ed Economics of Education **(**Ibadan**)**

A Thesis in the International Centre for Educational Evaluation,
Submitted to the Institute of Education,
in partial fulfillment of the requirements for the Degree of

DOCTOR OF PHILOSOPHY

of the

UNIVERSITY OF IBADAN

FEBRUARY 2023

CERTIFICATION

I certify that this study was conducted by **David Oluwaseyi OLADIMEJI** (Matriculation Number: 152657) under my supervision at the International Centre for Educational Evaluation (ICEE), Institute of Education, University of Ibadan, Ibadan, Nigeria.

……..

Supervisor

Eugenia A. Okwilagwe

B.Ed (Benin), M.Ed, PhD (Ibadan)

Professor of Educational Evaluation and

Social Sciences Education,

University of Ibadan,

Ibadan, Nigeria

DEDICATION

This research work is devoted to the All-surpassing God for this unmerited grace, mercy, favour, supply and protection towards achieving this height. This work is dedicated to **His Excellency, the Executive Governor of Oyo State, Engr. Oluwaseyi Abiodun Makinde (FNSE)** for reinstating and removing the wrong emblem which the last administration in the State labelled me with; and to my departed loved ones- late Mrs Olulaanu Oladimeji (Mother), late Mrs Omolade Akinosun (Sibling) and late Rev. Stephen O. Ajeigbe (Father-in-law) for their cares during their lifetimes.

ACKNOWLEDGEMENTS

I render my praises for the completion of this Thesis to the only wise God who has been my strength, help and ability. He has proved to me that indeed, *"I can do everything through Christ who fortified me"*, and by Him, I have done valiantly. Besides, I would like to thank everyone that have supported my aspiration in the Institute of Education, University of Ibadan, Ibadan, Nigeria.

Firstly, I owe Professor Eugenia A. Okwilagwe, my supervisor, a special thanks for her push and pull, efforts, timeless commitments, counsel and leading that made this research work attainable. Her pulls and pushes have driven me towards the realisation of this goal. Ma, you will ever be relevenant to humanity in Jesus name, amen. My appreciation also goes to "my co-supervisor", Dr Oluwatoyin Adeleke, for his painstaking efforts in frequently examining my thesis alongside my supervisor. I am highly indebted to Professors N.O. Owolabi and Olanrewaju Olaniyan and External and Internal/External examiners, respectively, for their efforts in adding value to this thesis. My God will not forsake you all. Amen.

Secondly, my sincere appreciation goes to the lecturers in the Institute of Education, University of Ibadan. I thank Emeritus Prof. Obanya PAI, The Director of the Institute Prof. Adegbile J. A., Prof. Adewale J.A., Prof. Onocha C., Prof. Okpala P., Prof. Yoloye, Prof. Emeke A.E., Prof. Falaye F.V., Prof. Isiugo-Abanihe, Prof. Onuka A.O.U., Prof. Odinko M.N., Prof. Osokoya M., late Prof. Adegoke B.A. and The Head of ICEE Dr Adeleke J.O., for their encouragement. I am additionally thankful to Prof Ibode F., Dr Akorede S. F., Dr Junaid I.t, Dr Babatunde E., Dr. Abijo A., Dr Metibemu M.A., Dr Omole O.T. - the Sub-Dean, Dr Oladele B.K. (Ass Sub-Dean) and Mr Desmenu M.O. for their efforts to guarantee the achievement of this work. I also wish to thank Prof. Alabi O.F. (Ajayi Crowther University, Oyo) for his excellent assistance while writing this Thesis. My gratitude further goes to the following people: Chief Adeniyi Falade (former PS, TESCOM Zonal Office, Oyo), Alhaji O. Odebunmi (former TESCOM Zonal Head Oyo), Pastor O.L. Suulola (current TESCOM Zonal Head Oyo), Mrs Adeola Ayoade, my former principal, Olivet Baptist High School, Oyo, Mrs Olanipekun, and all principals of Schools in Oyo East, Oyo West, Atiba and Afijio Local Government areas for their moral supports. The staff and students of

various schools where the review was done are highly appreciated for their cooperation and support throughout information gatherings for the study. Moreover, I am appreciative to all my research assistance, course mates, those who contributed toward this research attainment.

At last, I owe exceptional appreciation to my father, Mr E. Olaniyi Oladimeji, my siblings- Mr Tope Oladimeji, Mr Dotun Oladimeji, Mr Ayodeji Oladimeji, Mr Owolabi Oladimeji and Mrs Ikeola Oyetunde, in-laws- Rev. (Dr) Segun O. Ajeigbe and his family, Mr Tosin Ajeigbe and his family, Mrs Busayo Ojo and her family, and Mrs Victoria Ajeigbe (Mother-in-law) for all their prayer, financial assistance, encouragement and love. To my wife- Mrs Dorcas Oluwatoyin Oladimeji, and children- Master Isaac Anjolaoluwa Oladimeji, Master Emmanuel Olaoluwa Oladimeji and Miss Eunice Abiola Oladimeji, I appreciate your patience, perseverance and prayer throughout this work.

ABSTRACT

The low performance of students in public examinations in Senior Secondary School (SSS) subjects has been a source of concern to scholars and other stakeholders in education. Previous studies showed that quantitative Economics is difficult for students due to the teaching approaches adopted. Various research efforts geared towards improving students' achievement, learning and assessment-mode's attitudes towards Quantitative Economics through diverse instructional approaches have not achieved impressive outcome. Hence, there is the need for adopting teaching approaches that are both conceptual and experiential in nature to improve students' performance, learning and assessment-mode's attitudes in quantitative economics. This study was, therefore, designed to explore the effects of declarative and Enhanced-Declarative (ED) knowledge approaches on students' achievement, learning and assessment-mode attitudes in Quantitative Economics contents in SSS in Oyo town. The moderating effects of numerical ability and gender were likewise examined.

Adaptive Control of Thought-Rational (ACT-R) and Gagne's Systematisation theories guided the study, while a 3X3X2 factorial, non-randomised quasi-experimental design was adopted. The selection of three Local Government Areas and nine public senior secondary schools were purposively done while two hundred and nine from five thousand seven hundred and sixty-six SSS 2 students were considered. Data were gathered utilizing Quantitative Economics Achievement Test (r= 0.96), Economics Students' Learning Attitude Scale (r= 0.82), Economics Students' Assessment Attitude Scale (r = 0.89) and Numerical Ability Test (r= 0.81). Two teaching manuals used for the study were Declarative knowledge and ED knowledge. Descriptive analysis, Analysis of Covariance and Sidak *post-hoc* test were used to analyse at $\alpha_{0.05}$.

There were significant main effects of treatment ($F_{(2,194)}$=19.66, η^2 = 0.17), gender ($F_{(1,194)}$=5.33, η^2 = 0.03) and numerical ability ($F_{(2,194)}$=17.57, η^2 = 0.15) on students' achievement in quantitative economics. Treatment, gender and numerical ability were not significant on learning and assessment-mode attitudes in quantitative economics. The participants in ED group had the highest adjusted mean score ($\bar{X}$ =19.07) followed by the control group ($\bar{X}$ =15.98). Female students had the maximum mean score ($\bar{X}$ =16.88), while high ability participants had the uppermost mean score in numerical ability ($\bar{X}$ =17.19) followed by medium ability ($\bar{X}$ =16.20), and this implies that factor like gender can affect students' performance with respect to their numerical ability levels. The two-way and three-way interaction effects were not significant on students' achievement, learning attitude and assessment-mode attitude in quantitative economics. Students with high ability in groups had the highest mean scores in achievement. The result of the mean score suggests that female participants performed better than male colleagues in the numerical ability test.

Enhanced-declarative knowledge approach improved students' achievement in Quantitative Economics, regardless of gender and numerical ability in senior secondary schools in Oyo town. This study further suggest that this knowledge approach is better when relevant examples are used in the course of teaching and learning of quantitative economics.Writers of Economics textbooks should explore modules of the teaching enhanced-declarative knowledge approach and come up with texts that will promote internalisation of quantitative Economics.

Keywords: Declarative knowledge approach, Student achievement, Learning attitude, Assessment-mode attitude, Quantitative Economics

Word count: 488

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

ANCOVA- Analysis of Covariance

CKA: Conventional Knowledge Approach

DKA: Declarative Knowledge Approach

EDT: Economics Diagnostic Test

EDKA: Enhanced-Declarative Knowledge Approach

ESAAS: Economics Students' Assessment Attitude Scale

ESLAS: Economics Students' Assessment Attitude Scale

KR-20: Kuder-Richardson-20

LGAs- Local Government Areas

NAT: Numerical Ability Test

NERDC: Nigerian Educational Research and Development Council

TESCOM: Teaching Service Commission

QEAT: Quantitative Economics Achievement Test

WAEC: West African Examinations Council

CHAPTER ONE
INTRODUCTION

1.1 Background to the problem

Learning avails anyone the opportunity to acquire knowledge and skills to operate effectively within society. Learning provides a basis for wholesome life. Throughout life, human beings continuously learn new things daily. These kinds of learning, most times, emanate unconsciously or consciously. Unconscious learning is a product of daily and continuous observation by the learner; conversely, conscious learning requires deliberate planning of instructing and learning through the recommended educational program, season of learning, and ascertaining the state of comprehension.

Learning becomes unconscious mainly when learners acquire knowledge without delibrate plan to learn. In contrast, conscious learning is a deliberate attempt to impart, acquire and demonstrate what has been taught. Learning, therefore, includes recollecting authentic data, getting strategies, methods and approaches, getting verifications, dominating conceptual standards, acknowledgement, discussing thoughts, thinking, or creating conduct proper to exact circumstances; it is about modification of behaviour and view to situations (Fry, Ketteridge and Marshall, 2009). Thus, learning entails using the intellect to acquire knowledge, process, and exhibit previously encountered experiences in new scenarios. The degree of learning attainment can only be verified when it is assessed.

Assessment is the congruence between underlying mental processes and surface observation that can be verified. In reality, assessment influences what we learn. All in all, assessment is the association between educating and learning, and the most important determinant of student learning (Wiliam, 2013). Hence, assessment should be systematic and ongoing gathering, interpreting, and acting on information relating to goals and outcomes. It is through assessment that we can authenticate the classroom instructional activities. Ideally, assessment improves erudition; kindles self-confidence and self-esteem, provides a basis for a response on student progress; and develops skills in evaluation. This then makes assessment an indispensable component of curriculum

practice (Mikre, 2010). The effect of assessment is altogether detectable on students' presentation. Thus, the use of assessment has provideda means of ascertaining students' cognitive level, diagnosing learning disabilities, providing remediation and determining schools' achievement goals, which provides a basis for sharing objectives that are educational with students and for monitoring their progress.

Assessment, as a fundamental part of the teaching and learning procedure, provides the basis for gauging students' progress in any school subject and is used as the basis for making a valid judgement of the worth of the mark the student has obtained via the assessment instrument. In Economics, the cognitive domain is tested to determine and measure students' state of knowledge, intellectual competence and proficiency, and performance in the content taught. As a medium of ascertaining the level of knowledge, proficiency and skill acquisition, assessment instruments can be multiple-choice tests, essay tests, a blend of essay and multiple-choice tests, submitted homework, students' projects and students' notes (Okwilagwe, 2011). Thus, the teaching approach of a teacher should be to ensure beneficial changes in the student through the procurement of valid data, inclination capacities and great perspectives that will empower the student to prevail in school and be helpful to the society at large (Okwilagwe and Samuel, 2011).

Frequently, students perceive some school subjects to be difficult to understand, particularly mathematical-oriented ones such as Economics, Physics, and Chemistry, to mention a few. In their study, Gongden, Gongden, and Lohdip (2011) discovered no tremendous connection between students apparent complex Chemistry substance and their achievements in it. They then gave reasons for the perceived difficulty in Chemistry to include unfamiliarity with the ideas, insufficient explanation and practical work, ideas too demanding, confusing language, topics excessively numerical and absence of interest among male and female students. Based on Gongden, Gongden and Lohdip's (2011) conclusion, a critical revision was advocated on the curriculum, considering the intellectual capabilities and Chemistry (science) upbringing of the students.

Their results also show gender differences under challenging content. While the male students' viewed explicit subjects like laws of electrolysis, adjusting redox responses, Sulfur and its mixtures as trying, the females did not. The female students' viewed substance balance in reversible responses, synthetic responses, nitrogen and

compounds, and special release of particles, energy and synthetic responses as complex, which the males did not. Still, on assessing complex contents, Agboghoroma and Oyovwi (2015) noticed that students perceived specific biology topics like Ecology, Genetics, Hereditary as complex. However, they found that school location and gender did not affect challenging concepts in the subject. In another study, Ogunkola and Samuel (2011) findings indicated that specific science contents are more complex than others. So, matters about the instructing of these subjects may be a considerable donor towards the challenges experienced by students inside the learning of science by and large. The duo discovered that mostof the spaces of science that students experience difficulities with are in the themes of Chemistry and Physics (that are mathematical). In their view, Raymond, Raymond and McCrickard (2008) believed that Economics students remark the topic as being too hard because of its mathematical nature and that more effective mathematics teaching in Economics will alleviate the fear.

Thus, the teaching**,** learning, and assessment of Economics, as a school subject, obtain a relevant status in the modern and economic driven society. The advent of Economics in Nigerian schools' subject served as the landmark in the realisation of economic problems that were at the heart of modern society. Economics exposes and improves students' ability to manage personal finances, acquire learning skills and obtain some economic principles and applications. Economics knowledge, therefore, assists students with getting a handle on and create irreplaceable financial devices and abilities required for improving and advancing public advancement, just as developing monetary methods for addressing cultural glitches and daily survival in a competitive society. Besides, the study of economics offers students how commercial and financial transactions are practised locally and globally. Also, the study of Economics enables students to learn how to compare, assess and evaluate the viability of a project, business, and economy.

As a social science subject, Economics is a required subject at the Senior Secondary School. Globally, it is essential for most administration and social sciences courses in universities and higher institutions. As knowledge and skill-based subject, Economics ought to be taught using participatory methods that promote learning. According to Guglielmino (2008), the learning and teaching of Economics should avoid the traditional method of regurgitative learning which is a way of perfect memorisation. Such a learning process tends to render immediate assistance of passing the subject in

the face of quickly varying society and innovation. It is, therefore, essential for learners to acquire better approaches that will aid their knowledge and skills acquisition. Furthermore, the orthodox method of learning and teaching of Economics can no longer be based on educator focused showing designs, in this manner consigning students to an inactive job player simultaneously (Oyediji, 2014). This scenario has led to a significantly low performance of students in Economics, a situation that calls for quick intervention.

Interestingly, academic performance happens to be referred to as the pedagogic standing at a given moment (Adeyemi, 2011). It reflects the academic state of a student, which could be low, medium, or high. Economics students' academic performance in recent times has been characterised by low performance, and this has been persistent. Gegbe and Sheriff (2015) have tried to unravel the causal factors to inconsistent execution as low staffing, insufficient instructing/learning materials, absence of impetuses and helpless perspectives by the two educators and students. Other factors include poor school's location; continual modification of government policies; high student-teacher ratio; home-school distance; lack or inadequate supervision, monitoring and evaluation apparatus; conclusion of schools, which is the repercussions of instructors' strike activity; powerless and unconducive climate; absence of appropriate course readings; helpless substance and setting of guidance among others (Adepoju and Oluchukwu, 2011; Olorundare, 2011). The chief WAEC Examiners' reports between 2006 and 2020 revealed erratic students' performance in Economics, which has prevented mastery learning performance in this subject.

Table 1.1 Analysis of Enrolment and Performance of Students in May/June SSCE Economics (2006-2020)

Year	Total Sat	Credit and Above (A1-C6)	Pass and Fail (D7-F9)	5 Years Mean Credit & Above %	5 Years Mean Pass & Fail %
2006	1089355	538677 45.44%	550678 50.56%	47.88%	52.12%
2007	1183154	461903 39.04%	721251 60.96%		
2008	1204515	592939 49.23%	611576 50.77%		
2009	1270557	577345 45.44%	693212 54.56%		
2010	1228401	690949 56.25%	537452 43.75%		
2011	1413886	841258 59.50%	572628 40.50%	55.45%	44.55%
2012	1540902	864273 56.09%	676629 43.91%		
2013	1532194	1025703 66.94%	506491 33.06%		
2014	1363994	698669 51.22%	665325 48.78%		
2015	1175348	511007 43.47%	664341 56.53%		
2016	1071540	621755 58.02%	449785 41.98%	68.31%	31.69%
2017	1094454	691282 63.16%	403172 36.84%		
2018	1098525	828208 75.39%	270317 24.61%		
2019	1088918	740394 68.00%	348524 32.00%		
2020	1072067	825234 75.85%	246833 24.15%		

Source: The West African Examinations Council (WAEC), Test Development Division, Ogba, Lagos

Table 1.1 shows candidates' enrolment and performance in Economics during May/June WAEC SSCE between 2006 and 2020, which confirms the low academic performance. Although performance to the earlier years were low, the later years seems better (2010 to 2014 and 2015 to 2020), but the expected mastery performance is yet to be achieved. This low performance among Economics students seems to underplay the competency required in this essential subject.

Various factors in the literature have revealed reasons for low and poor students' academic performance. According to Oyediji (2014), these elements incorporate school quality, educator quality, school climate, arrangement of assets, and utilization of course books, instructing philosophy, and teacher attitude to teaching. Moreover, the most important of all these factors is the teaching methodology employed in effecting the knowledge and skills, which will afterwards lead to further developing learning results, and drawing out the ideal changes intrinsic in Economics teaching. It is essential to know that Economics is both non-quantitative and quantitative. It is non-quantitative (conceptual) because it requires the understanding of principles that apply to problems involving closed and open systems. It is quantitative (mathematical) because it uses a step-by-step mathematical approach. The teaching approach to enhance the learning of Economics ought to be embraced the teaching of concepts and problem-solving methods.

Economics, if properly taught, will produce an efficient and productive person who will be able to compete perfectly and proffer solutions to modern economic problems, and this will necessitate the utilization of fitting educating techniques. Rather than educating the subject as knowledge and skill-based discipline, some teachers still render it as a purely academic and expository subject, and this does not help much in promoting the knowledge and skill the subject required in the learners. Economics is a subject that contains many principles, formulas, rules, and matters to be solved. By its nature Economics can be extremely helpful in advancing basic and procedural reasoning just in light of the fact that its substance is inside the prompt reach of students. Since the point of instruction and learning Economics is not only to spoon-fed students, the teaching approach used by the teacher should go beyond the mere passing of examination to systemic practical and procedural knowledge. The improvement of students' scholarly abilities, and their capacity to reasonably, rationally, logically, critically, conceptually, procedurally and reflectively is paramount to the study of

Economics. Availing students with knowledge and skill-base willgo a long way in expanding scholarly abilities and their capacities to participate in insightful reasoning. Furthermore, the assessment mode that a teacher is adopting is equally of great importance in promoting the knowledge and skill acquisition of students.

As part of the solution to low and poor performance, it is needful for Economics teachers to introduce teaching approaches that can improve knowledge and skill acquisition. To achieve this feat, this study evaluated the outcome of declarative and enhanced-declarative knowledge approaches on the learning result of Economics students.

With reference to Rittle-Johnson and Koedinger (2009), declarative knowledge can be viewed as familiar with relevant concepts of particular subjects and principles adapted to new tasks. It is the knowledge thatcan be gained by studying media communications and literature (Lanzer and Taatgen, 2013). Rittle-Johnson and Alibali (1999) further described it as a clear comprehension of the principles governing a domain in addition to interactions between bits of knowledge in a domain. Declarative knowledge may hence be put to use when students must start to know the way standards are applied to issues including shut and open frameworks, just as the job of the time in responding to questions, and precisely how standards connected to the options that come with the issue classifications (Turns and Meter, 2011). Harris (2012) describes declarative knowledge as a teaching strategy that will help the learner to create meaning by linking new learning with the learner to make meaning by connecting new learning with existing information, expressing educational purposes and seeing the exercises, arranging and lumping data into conspicuous examples or memory aides, and expounding to fill information holes with the assistance of derivation. That is why Lauritzen (2012) refers to this pedagogical approach as ‘educational approach.’ Hence, declarative knowledge is an approach that should upgrade the learning and assessment consequences of students in Economics as a subject accepting it is fittingly used.

In the case of the Enhanced-Declarative Knowledge Approach (EDKA), this is an instructional approach that uses the combination of factual information and a sequence of steps or activities to complete a goal. It is both an educational and developmental pedagogical approach. It is primarily gained by observation, experiences, narration, role-play, imitation and constant practice. It can further be acquired through literature and media communication. Also, this approach stresses the

utilization of real-life experiences in teaching, which can lead to concept formation. In other words, concepts are derived via various experiential scenarios. It is believed that this approach will avail both the student and the teacher the opportunity to identify the necessary ingredients of a concept. It is, therefore, assessed mainly through problem-solving environments (Hernando, Guzman, and Conejo, 2014), which can then lead to concept formation. Just like the views of Berge and Hezewijk (1999), EDKA is an approach containing the knowledge of how to do things skilfully employing performance. It involves learning through constant practice. Competent and skilful learning then takes place through practice with conscious recall of the learning process experience. EDKA hence forms a crucial part of expertise.

While relating the skills acquisition of two groups, the strong and weak students, Turns and Meter (2011) noticed that vulnerable students were less disposed to apply the procedure of drawing components axes to help them acquaint with the direction of forces in Physics problems. It was reasoned that the hardships students have with tackling novel issues can be to some degree credited, at any rate, to shortcomings in their systemic approach to issues. With an enhanced-declarative knowledge approach, learners may be more knowledgeable and skilful when a systemic approach to a problem is involved. For instance, if a learner is giving an economic-related problem to solve, he or she is expected to display basic understanding and follow a particular path of procedure for solving such a task. Task-solving is a demanding-order reasoning procedure that will require executive control and incorporate more elementary skills (Olzmann, 2012).

As an addidtional approach to attain balanced and sustained high performance, there is need for enhanced-declarative knowledge**.** The knowledge of this instructional approach will help students to address economic issues such as what they have learned in connection with specific economic indices, economical ingredients that they have used, and they can run economic experimentations to comprehend the ideas involved. In learning Economics, the understanding of economics notions and problem-solving is fundamental. Hence, this study examined which of the two knowledge (instructional) approaches contributed immensely to advancing knowledge and skills required in quantitative Economics.

The dependent variables in this study are learning and assessment modes' attitudes and learners' achievement. The attitude of learners towards learning is critical

in the process of acquiring knowledge. Although learning is a medium through which knowledge and skills are learned, encouraging disposition has a far-reaching effect on the attached value given by a student. Learning can only be attained through the possession of optimistic attitudes. In line with Mokoro, Wambiya, and Aloka (2014), attitude is animaginarythought that indicates a person's abhorrence or preferences towards a thing. It could be unbiased, negative or positive. Disposition is a sensation, demeanour, approach and circumstance, concerning a thing or person. It is acourse or an inclination, especially of the mind, affecting how we look at things.

Fatoba and Aladejana (2014) described attitude as the human tendency to organise thought, emotions, and behaviours towards a psychological object. An antecedentserves as an input or stimuli that activate actions and likewise bothers their retention. That is why Kidane and Worth (2013) posited that it is a veritable tool to comprehend and foresee individuals' responses to an article or change and how conduct can be effected. Disposition fills in as a vehicle of associating and separating an article dependent on the pre-information on the item. Besides, perspectives are accomplished through learning and can be improved through effect utilizing an assortment of procedures. While attitude continues to change, individuals will in general, take up another type of demeanour and change old lifestyles when they are opened to innovative encounters and data (Adesina and Akinbobola, 2005). When an attitude is embraced, it assists with framing the abilities the individual has with an individual, an item (Ibeh, Onah, Umahi, Ugwuonah, Nnachi and Ekpe, 2013).

The significance of learners' attitudinal factors as execution indicators has been emphasized by numerous researchers who demonstrated that student learning mentalities and interests could have a critical influence among students (Adodo and Gbore, 2011). This means that attitude forms the basis of the academic and learning achievement of any student. Adodo and Gbore (2011) thought that students' attitudes are probably to try out a critical part in any good clarification of levels of learning in school’s subjects. The findings of Festus and Ekpete (2012) corroborated Adodo and Gbore (2011) that students’ learning attitudes and interests could play an extensive role in enhancing performances. This implies that a positive predisposition of learners could fast-track their learning speed and could be the most significant predictor for assessing students’ success. Therefore, students’ beliefs, feelings, emotions or intended behaviours must be mobilised towards the right learning attitude.

Similarly, researchers like Dhindsa, Omar and Waldrip (2007), Birenbaum and Feldman (1998), and Struyven, Dochy, and Janssens (2005) have studied the contribution of students' assessment-mode attitude towards learning. They have concluded that assessment-mode attitude has a far-reaching effect on students' performance. Mussawy (2009) inspected the association between students' learning-related attributes and their premium in two evaluation designs (built/constructed reaction and decision/choice reaction). They found that students' abilities towards every last one of the two appraisals designs (built/constructed reaction versus different decision/choice reaction) show a connection between students'learning-related cycles of the intellectual and affective perspective. In another investigation, Birenbaum and Feldman (1998) estimated students'attitudes towards numerous decision assessment organization and open-finished assessment types against gender, scholastic self-idea, intelligent preparing, agentic handling (learning methodologies), test tension concern, and test uneasiness emotionality. They set up that sex, agentic handling, and orderly investigation fundamentally related with the numerous decision design. Additionally, the examination infers that male members by and large have sensibly more reassuring perspectives toward different decision design than females.

Considering the relevance of quantitative Economics in the modern world, it is evident that failure to have numerical control is equivalent to low and poor performance in problem-solving skills. Without mathematical ability, students of Economics will discover it hard to excel in this world of numbers. Akinsola and Odeyemi (2014) then viewed mathematical capacity as the ability of students to play out some numerical computations spur of the moment or without the utilization of any mechanical gadget. This capacity could be low, medium or high. Therefore, students must have minimum numerical ability skills necessary for passing Economics. That is why problem-solving methods are more beneficial and reliable means of promoting numerical skills in students and that the students with high mathematical capacity will play out significantly better compared to their low mathematical ability counterparts (Fatoke, Ogunlade, and Ibidiran, 2013). Akinsola and Odeyemi (2014) affirm further that students' mathematical capacity could influence learning and maintenance and academic fulfilment. It could also determine the concepts formation, imagination, perception, language, and problem-solving ability of learners.

Adigwe (2012) found out that in Mathematics, students had considerable

positive achievement about performance in chemical stoichiometry, which is mathematical, thereby promoting learning and leading to high cognitive levels among students. In another study, Okwilagwe and Oyedepo (2007) observed that though students find it challenging to study and understand the quantitative aspects of Economics, quantitative Economics is very relevant in modern times, and students must do well in it while learning secondary school Economics. Their findings also indicate that mathematical Economics contributes immensely to students' success at the secondary school's Economics. In essence, quantitative Economics is very pertinent and essential in concretising knowledge acquisitions in this age.

Research findings that have used gender as a moderator variable have shown mixed empirical proof about gender's effect on students' performances. Fatoke, Ogunlade, and Ibidiran (2013) shows that male and female students of high mathematical capacity levels wouldperform better than their low capacity level partners. Essentially, Akinsola and Odeyemi (2014) while giving an account of the meaning of the direct effect of gender on students'success in Mathematics, observed that male students performed better contrasted with female partners in mathematical testing and that this is because male students found the (critical thinking) techniques simple and could carry out the system than females. Again, Archibong (2014) revealed that gender had no considerable effecton students' performance of learned concepts (declarative knowledge). Olasehinde and Olatoye (2014) similarly detailed no huge contrast between male and female learners in science achievement and attitude to science.

Adigwe (2012) observed that the male assembly accomplished essentially more remarkable than the female assembly in Mathematics and Chemistry. High performance in science was joined by progress in Mathematics capacities. Meanwhile, Casey, Dearing, Vasilyeva, Ganley, and Tine (2011) saw that young men do well than young ladies on the spatial–applied things. Conversely, young ladies out flanked the young men on the equation-based things. These discoveries build up the view that spatial–calculated an equation-based subtests are best investigated as extraordinary spaces of estimating execution however nullify the finishes of Akinsola and Odeyemi (2014) which expresses that male students performed better compared to females in mathematical (formula-based) testing.

Oyesiji (2013) argued that learning outcomes should catch the progressions that

happen in their full of feeling and intellectual turn of events and not only demonstrate what students know because of learning experiences that have occurred. Because of the benefits that accrue to declarative and enhanced-declarative knowledge approaches, gender and numerical ability on students' attitudes and learning outcome, this study explored the effects of two treatments on learners' achievement, learning and assessment-modes attitudes among students offering Economics in SS two in public senior secondary schools in Oyo town.

1.2 Statement of the problem

Economics is a field of study through which people learn about economic problems, causes and how to fix them for the continuity of economic-driven society. This underscores the importance of the subject during the secondary school level. Unfortunately, academic and other stakeholders, in the field of teaching, have been concerned about students' low performance in the subject. Previous studies have observed that quantitative Economics is difficult for students, who fail to attain high academic excellence in this aspect of Economics, based on the teaching approaches adopted. Various research efforts have been made to improve students' achievement in quantitative Economics through diverse instructional approaches, yet students' performance remains relatively low. Besides the instructional approach that stands as one of the contributing elements to high or low performance in any subject, students' learning attitude is another decisive factor in student achievement. Literature has also revealed that students' attitude towards evaluation system stands a chance to influence learners' scores in any subject. Teaching approaches that are both conceptual and experiential were not focused on nor had students' attitudes towards learning and assessment modes been vigorously addressed to effect students' performance in this aspect of Economics. It is then vital for Economics teachers to develop an appropriate teaching approach that will not only lead to high and stable performance in quantitative Economics but also boost their attitude towards learning and assessment mode in testing future economists.

In the literature reviewed, evidence has indicated that further researches on cognitive sciences should concentrate more on knowledge of procedure and its relation with declarative knowledge. However, such studies need to be experimented so that collected data can be analysed. This research was, hence, designed to explore the effect

of declarative and enhanced-declarative knowledge on students' learning attitude, assessment modes' attitude and achievement in quantitative Economics. The moderating effects of numerical ability and gender were also investigated in the study.

1.3 Objectives of the study

The objective of the study was to investigate the effects of declarative and enhanced-declarative knowledge approaches on students' learning outcomes in quantitative economics contents in secondary schools in Oyo town.

In specific terms, this study: examined the contribution of the two knowledge approaches on students' performance in quantitative economics; observed the learning attitude of students towards quantitative economics; and attitudes of learners with respect to assessment-mode that was used in estimating their knowledge of quantitative economics.

1.4 Hypotheses

Concerning the stated problem, the study tried the accompanying null hypotheses at 0.05 degree of significance.

Ho1: There was no significant main effect of declarative, enhanced-declarative and conventional knowledge approaches on:

i. students' achievement;
ii. students' learning attitudes; and
iii. students' assessment-mode attitudes in quantitative Economics.

Ho2: There was no significant main effect of gender on:

i. students' achievement;
ii. students' learning attitudes; and
iii. students' assessment-mode attitudes in quantitative Economics.

Ho3: There was no significant main effect of numerical ability on:

i. students' achievement;
ii. students' learning attitudes; and
iii. students' assessment-mode attitudes in quantitative Economics.

Ho4: There was no significant interaction effect of treatment and gender on:

i. students' achievement;
ii. students' learning attitudes; and

iii. students' assessment-mode attitudes in quantitative Economics.

Ho5: There was no significant interaction effect of declarative, enhanced-declarative and conventional knowledge approaches, and numerical ability on:

i. students' achievement;

ii. students' learning attitudes; and

iii. students' assessment-mode attitudes in quantitative Economics.

Ho6: There was no significant interaction effect of gender and numerical ability on:

i. students' achievement;

ii. students' learning attitudes; and

iii. students' assessment-mode attitudes in quantitative Economics.

Ho7: There was no significant interaction effect of declarative, enhanced-declarative, conventional knowledge approaches, gender and numerical ability on:

i. students' achievement;

ii. students' learning attitudes; and

iii. students' assessment-mode attitudes in quantitative Economics.

1.5 Scope of the study

The study examined the relative effectof declarative and enhanced-declarative knowledge approaches on students' learning attitude, assessment mode's attitude and academic achievement in quantitative Economics. The study was restricted to S.S. II (Senior Secondary School two) students in nine selected schools across Oyo East, Oyo West and Atiba local governments in Oyo town. A total of all intact classes of two hundred and nine students took an interest in the investigation. Discoveries with this study were generalised to the factors and populace of the review only.

1.6 Significance of the study

Low performance among Economics students has been a source of concern to scholars, educational researchers and other stakeholders. The implication of this study is expected to be felt by the students, the teachers, the school management, the writers of economics texts and other stakeholders in the education industry.This study further

provided a basis for closing educational gaps through the use of practical and enhancing instructional approaches that will avail economics students the opportunity to deduce economic concepts through their daily contacts with real-life economic activities. A practical teaching-learning approach also provides Economics teachers with a tool to support their students to internalise the instruction.The study also provides school teachers with a knowledge approach that can deliver the expected result to the school and attain mastery learning goals. The study further breaks away from the old regurgitative knowledge style and provide a robust knowledge approach towards quantitative Economics. Theoretically, the Adaptive Control of Thought-Rational (ACT-R) theory helped students learn complex competence through simple knowledge units and principles.The theory also provided teachers with information on how intellectual and skillful knowledge are formed and used. On the other hand, Gagne's systematisation theory availed teachers with systematic instructional procedures that resulted in corresponding cognitive achievement among learners.

Methodologically, the appropriation of the knowledge of declarative helped learners to have theoretical facts of rules and principles. In the same vein**,**the EDK approach revealed the potential of integrating the exact meaning of terms and concepts and their practical application, which eventually helped solve economic problems, thereby promoting intellectual knowledge in long term memory. The study was further provided additional empirical findings to the two knowledge approaches.

Finally, the study's outcome provided teachers of Economics with practical knowledge approaches for quantitative and non-quantitative Economics problems solutions, thereby improving their occupational competence.

1.7 Definition of terms

Conceptual definition of terms

Attitude: An attitude is a way of thinking, feelings and sentimental practices toward a particular article, individual, event or thing which will consequentially have direct effects on its exhibitors and receipents. While attitudes are endured, they can in like manner change positively or negatively.

Learning Attitude: Learning attitude determines how one perceives things and what one will become as a person. It also determines how successful one will become in making oneself world-class in something and making great money.

Assessment-mode Attitude: Assessment-mode attitude determines how one perceives evaluative systems and performs in whatever assessment mode is used. It also determines the level of readiness one will put up in preparation for assessment.

Learning Outcome in quantitative Economics: This is the academic achievement result through efforts of a student's work accomplished in short or long term standardised tests in mathematical aspect of Economics. It is a remarkable numerical success towards a set goal by student, teacher or an educational institution in quantitative Economics.

Gender: This refers to human biological classes of masculine and feminine sexes. This moderator variable varies in two levels of male and female students.

Operational definition of terms

Declarative Knowledge Approach: This approach was basically for treatment group one, where concept-based teaching was used to teach selected contents in quantitative Economics. Listing, elaboration strategies, factual and specific information on the characteristics, terminologies, properties, phenomena, concepts, principles and techniques were employed in teaching the content and teachers provided relevant examples. This approach was measured with multiple-choice and essay items.

Enhanced-declarative Knowledge Approach: This was a teaching and learning approach that enables learners to gain factual and step-by-step knowledge of providing a solution to a problem. Teachers in this treatment group used casestudies, analytical and life practical experiences in teaching the selected contents. At the same time, students derived information on the characteristics, terminologies, properties, phenomena, concepts, principles, and techniques from scenarios used by the teacher. This approach was measured with multiple-choice and essay items.

Conventional Approach: This denotes to the typical chalk-and-talk teaching approach that comprises the teacher amplifing and clarifying the topic and concepts while students were passive. This approach was likewise measured with multiple-choice and essay items.

Numerical Ability: This refers to students' capacity to manage numbers and tackle basic numerical logic, mathematical explanation, statistical estimation, numerical computation and data representation. A numerical capacity test was utilized to order students into three groups of high, medium and low levels.

CHAPTER TWO

REVIEW OF LITERATURE

In this part, significant writing was explored based on both theoretical and empirical findings of previous researchers on various aspects of the problems of the study.

2.1 The theoretical background

Two theories underpin the focus of this study, namely- Adaptive Control of Thought- Rational (ACT-R) and Gagne's Systematisation theories.

2.1.1 Adaptive control of thought- rational (ACT-R) theory

The Adaptive Control of Thought-Rational (ACT-R) is a universal philosophy of human cognitive process established through John Anderson and colleagues at Carnegie Mellon University. ACT-R happens to be considered a straight forward theory of learning and cognition (Anderson and Schunn, 2000). It was postulated to model problem-solving, learning and memory (Olzmann, 2012). It put forward that complex ideas are made up of simple and easy knowledge units gained through not all complex principles (Anderson and Schunn, 2000). The ACT-R theory emphasises that to understand a complex proficiency, each element of that skill must certainly be mastered.

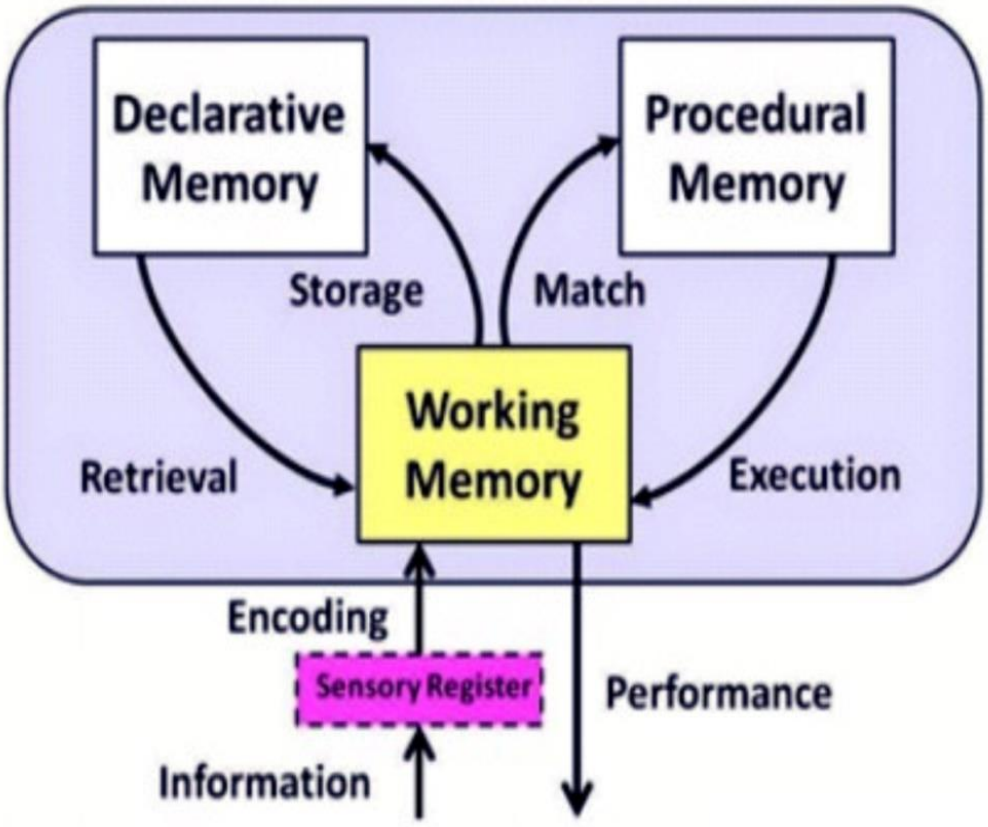


Figure 2.1: ACT-R Cognitive Architecture

SOURCE: Adapted from Anderson and Schunn, 2000, graphic by Steve Wheeler

The primary feature of ACT-R is that it is a construction system theory. The fundamental assertion of this production system theory is how intellectual finesse is made out ofa provisional proclamation acknowledged as *production rules*. A production rule is a declaration that explains a stepthat should be drawn in if a condition is met, once in a while alluded to as a *condition-action pair*. For example:If the rationale was to define ‘order’ for a commodity, and the ‘order’ has four ingredients- willingness, ability, time and price, THEN define the ‘order' as a DEMAND.

Concerning long-term memory, ACT-R is divided into two- declarative and procedural. Declarative memory consists of actualities such as "Economics is ascience which scrutinises human conduct as a communication among ends and rare (scarce), resources (means) which may have elective utilizations "or "A cost is a worth that has to be paid or spent buy or acquire something". Procedural memory comprises our knowledge of doing things, though we may not verbalise how they were done. An example of procedural knowledge includes our ability to determine the coefficient of elasticity of demand. In ACT-R, declarative knowledge refers to units otherwise known as *chunks,* while procedural knowledge is epitomised by *productions*, which are gathering production rules. ACT-R defines a language structure to address production and chunks.

According to Anderson and Schunn (2000), the ACT-R theory has three essential paired peculiarities. First, there is without a doubt a division between the two knowledge types - declarative knowledge of facts and procedural information on performing different psychological obligations. The second dissimilarity is between the performance suppositions of arranging what is known in ACT-R to resolvean assignment and the learning hypotheses of how new information is procured. The third contrast is between the representative degree of discrete information structures and a sub-emblematic degree of neural-like actuation based cycles that decide the accessibility of these emblematic constructions.

The essential, instructive inquiry concerns how these revelatory and procedural units are learned. There is a relatively straightforward analysis of ACT-R declarative and procedural units’ acquisition. Declarative chunks are acquired in two ways. The only means is the encoding of information from the environment. The following means is the storage associated with the outcomes of past goals. This course of putting away

the consequences of past mental calculations into pieces that would then be able to be recovered plays a significant role that is crucial in advance of proficiency.

Thus, when acquiring declarative knowledge, ACT-R assumes that such knowledge can be obtained through inactive, friendly or receptive mode (absorbing from the environment), deliberate and organised mode (putting away the consequence of past mental contacts). The two ways of knowledge achievement provide different merits and demerits. Efficiency and accuracy are parts of the advantage of passive reception. It is easier to define demand than to calculate the elasticity coefficient of demand, and there is no threat of mistake. Having said that, if an individual practice generatesthe information, one is practising a backup policy valid for when recovery falls flat. Be that as it may, as indicated by ACT-R, there is no intrinsic distinction in the memorability of the two kinds of information.

Concerning procedural information, creation orders are learned in ACT-R by a course we callanalogy. In ACT-R, for the analogy to function, two things must hold. One, there must be a situation for attaining a goal. Two, the learner needs an illustration for a better understanding of the focus. So, there might be an instance of tackling the coefficient of the flexibility of interest. In such a circumstance, the ACT-R similarity component will attempt to digest the standard in the model and structure a creative arrangement representing this guideline which would then be able to be utilized in the current conditions. Subsequently, ACT-R's hypothesis of mastering methodology expresses that procedural abilities are gotten by making implications to point of reference issue arrangements while overwhelmingly attempting to address new inquiries. Hence, it is both a learning theory by doing and as a visual demonstration (example).

Simply furnishing the student with occurrences (examples) is not adequate to ensure learning in the ACT-R hypothesis. The ampleness of the creation rules procured relies upon the comprehension of the outline. Understanding significant models can effect learning in two ways. One, it can effect which models are recovered for analogising. When we are stood up to with an issue that cannot be taken care of with current creation strategies, ACT-R searches for past models that it has experienced including comparable objectives. Two, understanding the model will decide the creations that are gained by relationship to a given model. For example, in deciding the coefficient of the versatility of interest, one needs to comprehend a model including

rate change in the amount requested and rate change in cost before showing up at the worth of the coefficient of the flexibility of interest.

ACT-R core values incorporate acknowledgement of the objective construction of the issue space; the arrangement of the guidance with regards to critical thinking; the arrangement of prompt input on blunders; minimization of working memory load; change the 'grain size' of guidance with figuring out how to represent the information accumulation measure and empower the student to move toward the objective ability by progressive estimate.

2.1.2 Gagne's systematisation theory

Various instructional theories have been propounded, and each of them has its essence. The learning and developmental theory of Gagne is one of the exceptional learning theories that place a premium on systematic instructional procedures (Khadooi, Rostani and Ishaq, 2011). The essence of this theory is on systemic intellectual skills acquisition. Gagné used standard practice as a stimulus for the development of theory.

This theory believes that learning levels are in several parts. The theory is of the assumption that different learning type requires different instructional types. The theory has been classified into five learning categories (Kurt, 2020). These include oral expression, intellectual skills, cognitive approaches, motor skills and attitude. It is evident that for a cognitive approach to be functional, there is a need for constant practice to develop a new solution to problems and adopt better attitudes towards learning by students.

The theory suggested that learning should be prioritised hierarchically according to difficulty, stimulus acknowledgement, discriminations, reply generation, problem-solving method following, rule application, terminology, and concept formation. The quintessence of hierarchical order is to recognize fundamentals that should be refined to help information procurement at each stage. Fundamentals are perceived by doing an assignment assessment of a picking up endeavour. Learning orders give an establishment to the masterminding of guidance.

Likewise, the hypothesis diagrams nine educational occasions and relating intellectual cycles (Khadooi, Rostani and Ishaq, 2011):

(1) **Gain the students' attention** (assimilation) by ensuring that students are

prepared to learn and take part effectively through invigorating introductions that charm students' consideration. Instructors would then acquire students' consideration by invigorating students with oddity, vulnerability and awe, suggesting exciting conversation starters. Presently, students offer conversation starters to be replied to by other students.

(2) **Notify students of the targets** (expectancy)before teaching commences. The accompanying strategies can be utilized for communicating the typical direct: depict required execution; portray models for standard execution, and student sets up rules for standard execution.

(3) **Provoke recollection of past learning** (retrieval) by relating new knowledge with previous experiences. This can be done byasking questions about previous encounters and asking students to understandformer concepts.

(4) **Present the content/stimulus** (selective perception)**.** Selective perception involves usingsystems to give and sign exercise content to supply more successful, proficient guidance. Put together and separate the substance into a significant viewpoint by giving clarifications, jargon, models and use a different medium to handle different learning favourites.

(5) **Provide learning guidance** (semantic encoding) that will aid students in learning content such as role playing, analogies, mnemonics, case studies, concept mapping, examples and non-examples, and metaphors to aid learning.

(6) **Occasion performance** (reacting /practising)**.** Enact student preparing to help them disguise extra abilities and information and affirm the proper comprehension of these ideas.

(7) **Make available feedback** (underpinning)**.** This entails giving a quick response on students' achievement to assess and make possible learning. The feedback may be confirmatory, remedial, informative, analytical, corrective and remedial feedback.

(8) **Weigh performance** (retrieval): To measure the gains of the instructional activities, the test must be conducted to see ifthe expected learning outcome had been attained. Learning assessment can take the type of a pre-test for authority and endpoint information, post-test for mastery check of content, frequent questions through oral questioning and quizzes and recognise normative-referenced performances which relateone scholar to another scholar, you need

to test to check whether expected learning results have been accomplished or criterion-referenced performances which quantify how great a learn has taken in a theme.

(9) **Improve retention and transmission to the job** (generalisation)**.** To assist students with creating capability, they should disguise new information. Strategies for assisting students with disguising information include: producing models, make idea guides or frameworks, templates, or wizards, use metaphors, paraphrase content, create jobaids, references.

Before any learning instruction conforms to Gagne's theory, the following principles should be strictly complied with (Gagne and Driscoll, 1988):

i. diverseguidance is needed for unexpected learning results.
ii. Events of learning work on the learnerwith techniques that set up the conditions of learning.
iii. The exact activities that establish informative occasions will shift for every unique assortment of learning results.
iv. Learning pecking orders characterize what scholastic abilities ought to be acquired and a grouping of guidance.

2.2 Conceptual review

2.2.1 The nature, scope and importance of economics in secondary education

These days, the perception of the economic issue has gotten very imperative for all areas of society. Everybody needs to be affluent; increment their abundance holding; have a hold over valuable assets, and amplify their business exercises. Individuals need to get an ever-increasing number of benefits and exercise control of the commercial centre alongside other monetary frameworks; increase their living expectations and appreciate increasingly more utilization; make their future secure, and develop from the current area. On these notes, individuals want to refresh their knowledge of monetary issues and benefit as much as possible from that. Moreover, individuals need to fill even in antagonistic circumstances or possibly carry on under these circumstances. This suggests that individuals need to turn out to be financially more essential and conceivable to lead a superior way of life. This calls for a satisfactory understanding of the monetary issue. Such understandings might be developed through formal and informal methods of learning. At times, the understanding of economic matters is

gained through informal means but those who intend to make a mark undergo formal proceedings. This then gives them the right knowledge of Economics. They can apply this information in different contexts. Economics is the study of ways that humans deal with these issues and challenges (Reynolds, 2005).

Economics cannot be underestimated when we think of its vitality in the era. According to Ande (2008),Economics belongs to a group of subjects called social sciences, which manage different parts of human conduct. Economics is additionally worried about human practices, for example, how individuals accomplish their needs. As a social science subject, Economics is likewise worried about the investigation of firms or organizations and the public authority responsible for giving labour and products to its kin to meet their needs.Although Economics is usually referred to as a science subject, the fact remains that it does not expect a similar accuracy and exactness level as natural or pure science like chemistry, physics, and biology. This is on the grounds that it manages human behaviour, which is very complex to determine.

The instructing and learning of Economics in secondary education is essential because it allows students to know how scarce resources are allocated among various sectors of the economy. It informs students on the rationale for human decision of choice among diverse needs within their limited resources. The importance of learning Economics provides necessary apparatuses for investigating monetary issues among people, firms and government. Economics is significant because it empowers people, firms, and the public authority to take care of their issues utilizing different standards. The comprehension of Economics assists with deciding the example of human consumption of materials and services. The study of Economics helps develop the principles of choice, the scale of preference, opportunity cost, and others to fulfil human needs. Eventually, the comprehension of the subject of Economics avails students and other citizens to contribute energetically in the art of governance.

2.2.2 Patterns of teaching

Learning is a cognitive, affective and psychomotor task of acquiring knowledge and skills by students. Learningrequires active and constructive student participation. Learning is primarily a social activity that is achieved through the interaction of students with tutors and the world around them. Student participation in social life is, therefore, fundamental to learning. Students need to secure expert words which are

connected with the discipline method of reasoning. Over the long haul, this may support students to comprehend the technicalities in a more meaningful way. If students should be able to utilise their Economics knowledge, to 'think like a economist' not in the home room and formal evaluation, it is vital which they track down the abilities to decide and accurately utilize the 'perspectives and rehearsing' inside the discipline that permits an application to new circumstances with the aid of good learning pattern. In the teaching and learning of Economics, various learning styles have been used to teach the subject.

In his seminar, Professor Jan Vermunt (2013) identified eight teaching and learning methods. These are traditional (chalk-and-talk) instructing, task-based educating, issue-based educating, project-focused learning, self-coordinated specialization learning, capability-based educating, double or work-based learning and self-teaching learning. Assignment-based teaching refers to when teachers give an assignment to students for other practice. This teaching method helps engage the student in the constituent practice of what has been taught in the class. Project-based learning is an appearance procedure by which students develop data and capacities by a lengthy time span to examine and react to an attracting and complex request, issue, or challenge. Issue based learning occurs when students are faced with challenges of solving mathematical or related problems that involve systemic procedures. Project-centred learning is a learning pattern in which a particular problem is given to students systematically executing them. At this juncture, teachers serve as a guide towards attainment of the goal.

Competency-based learning is a teaching and learning approach often utilized in mastering substantial abilities instead of digest acquiring.The learning pattern here is organised around the practice and ethics of a particular field of study. This learning style avails students with firsthand experience and technicality involved in the practice. Autodidactic learning is self-learning with little if any initial understanding of the topic. A student who chooses to learn through this style, personal dig deep into the area in which they think they need more understanding of such. Of all the methods highlighted by Vermunt (2013), only the traditional teaching style has been widely used.

Becker and Watts (2001) observed that the teaching patterns that produce learners continue to be the ‘chalk-and-talk method. This method, therefore, uses lecture style which supports notes taken, equations and graphs written on the chalkboard (Terregrossa, Englander and Wang, 2009). This traditional teaching style focuses on

the board and presentation by the teacher while learners are passive in the process. Much priority is given to teachers to the detriments of learners. Moreover, the style is used to pass much information in a short time frame (Bergin, Eckstein, Manns and Sharp, 2004). The chalk-and-talk strategy has disregarded contrasts in learners' learning styles and the likely upsurge in studentachievementthat relates instructors' showing strategies with students' learning styles. That is why Thien (2009) advised that teachers mustnot exclusively rely upon the alleged chalk-and-talk strategy when they need their students to take part. Since lecture-style prevents students from learning correctly, most students have to resort to regurgitative learning. Regurgitative learning is, therefore, referred to as the perfect memorisation of lessons. Students have to cram what they have been taught so that they can pass the exam. Considering the nature of Economics, mere memorisation of theories without deep understanding and application in the real-life will not help. This style of learning can only successfully contribute to poor memory retention (Guglielmino, 2008).

It is now general submission that teaching and learning should go beyond chalk-and-talk teaching and regurgitative learning styles because it undermines students' potential. There is proof from different sources that bunches of students in Economics 'gain' an assortment of ideas. Notwithstanding, it has little effect on how they experience monetary peculiarities. Bergin *et al.* (2004) then proposed active learning. They believed that when students actively participate in teaching and learning processes, there will be improved learning. If students tune in to explanations without themselves becoming drawn in, what precisely is discovered is probably not going to get into long haul memory. In this way, to keep the students dynamic, they should be dynamic in class, either with questions or with works out. They ought to be dynamic out of class.

Furthermore, active learning requires more efficiency and effort on the side of the students when it comes to preparation, participation and attentionthroughout the lesson. There is no substitute for learning-by-doing. An exercise that will allow the practice of newly acquired knowledge and skills should be made available to learners, and a quick review of the exercise with immediate feedback on the exercise to the learners. Active learning will also be attained when concepts are taught directly to the outside (Bergin et al, 2004).

In their review, Terregrossa *et al.* (2009) reported various research findings concerning Economics learning. They affirmed that an increase in students' academic performance that is associated with similar teaching and learning styles are not strange to Economics' field. Terregrossa*et al.* (2009) found that when there is a slight difference between teaching and learning styles, students would learn more and put upa more positive attitude toward learning. In another review, Brokaw and Merz (2000) studied the effect of both student behaviour and learning styles on student success in microeconomics' principles courses. The outcome showed that learners whose learning styles separated and their teachers' "chalk and talk" style had higher fundamental grades than those students whose learning styles did not relate. At large, it was discovered that when a scholar's learning style correspond with the teacher's teaching style, student grade improved by half.

Hence, "a competent Economics instructor needs to understand that course material presented to students is not enough but that they get it. There should be an interplay between the teaching process and the outcome. This interplay refers to the assessment mode. When measuring learning, the instructor will have to identify specific goals and objectives for each topic systematically estimates the extent to which these anticipated outcomes occur and determine the degree of learning.

Empirical review

2.2.2 Declarative knowledge approach

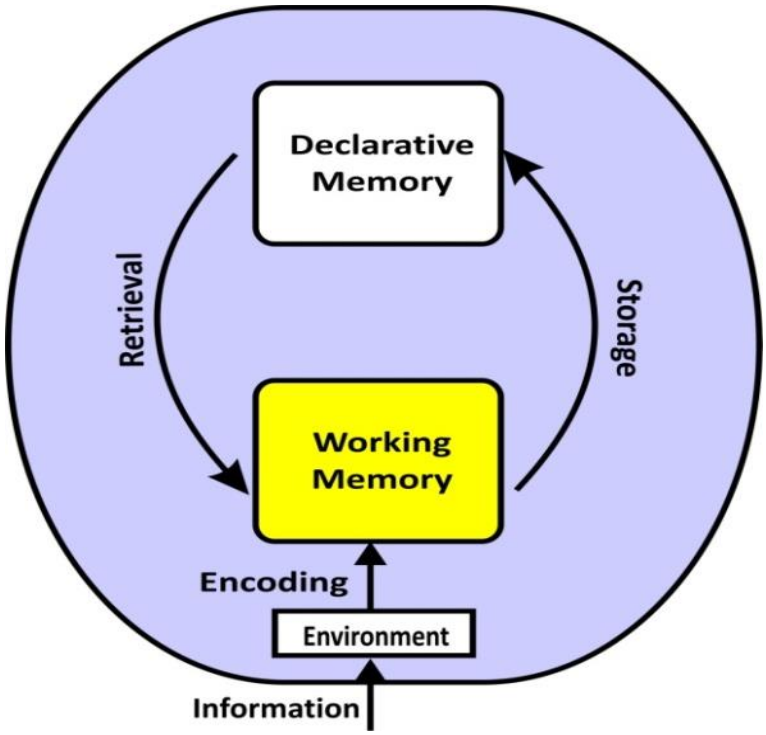


Figure 2.2: Declarative Memory (DM) Model

SOURCE: Adapted from Anderson and Schunn, 2000

The above model is a model on how human cognition works. The construct is based on several facts derived from psychology experiments. The declarative system includes all memories of event, facts, ideas and experiences. Everything that is consciously experienced is part of this memory. The model beliefs that information on a particular concept is acquired from the environment (through either literature or mass media) which is encoded into working memory. This working memory is the state of mind where processed information can be overwhelmed with cognitive units, and therefore inhibit our performance. It facilitates planning, comprehension, reasoning and problem solving. On the other hand, declarative memory is a conscious recollection of facts, experiences, events and information used in everyday living (working memory). DM is a long time memory where information is stored and retrieval is made for transient use in working memory.

Declarative knowledge is the simplified way of consciously providing information on a particular concept. Knowledge of ideas, propositional, conceptual or descriptive knowledgeis often regarded as declarative or conceptual knowledge(Canobi, 2009; and Rittle-Johnson, Siegler and Alibali, 2001). It is the accurate understanding and information on abstract representations of concepts. In other words, declarative memory is about making differencesthat can lead to the development of abstract representations of ideas progressively. In psychology, declarative knowledge that is considered to be static refers to information or facts that arestored in the memory. It describes things, processes, or events; their attributes; and their relation to each other. Declarative knowledge can be taught using listing, underlining, and reflecting as well as the use of questions. Analogy, imagery, organisation, mnemonics, elaboration strategies, chunking, linking, rehearsals and graphic organisers are all learning strategies that can be employed (Oosterhof, 2012).

A crucial element of declarative knowledge is that it is not difficult to be communicated as images or words. Declarative knowledge is apparent and express. This implies you know it if you know it. You are purposefully mindful of the importance of declarative information. In teaching, declarative learning is attainingmeaning that one can speak about and not motor learning. A concept (demand) is a piece of propositional information while understanding how to experiment with the concept of *demand* is not. In the meantime, multiple-choice questions (MCQs) are used in assessing (declarative knowledge) cleanremembrance of particular isolated pieces of

knowledge such as facts, terminologies, concepts, definitions, etc. Declarative knowledge strategies can help the learner forminformation by linking new knowledge with an existing one, stating educational reasons and screening the educational gains, sorting out and piecing data into specific examples or mental aides, and explaining to fill information holes with the assistance of deduction.

The declarative memory, as long haul memory, can be put away as far as realities. Declarative memory depends on review and recovery (Anderson and Schunn, 2000). Declarative memory recollections are realities or recollections of previous occasions that can be 'pronounced' instead of performed. Declarative portrayal (also called the information on theoretical principles) implies that students store data in long haul memory as a record, which appears as a bunch of semantic organizations and an expansive arrangement of practical activities (rules) to utilize the information (Lojová, 2009). Declarative memory has to do with the storing of facts, information and events one has experienced personally. Remembering accurate information from declarative memory involves some level of deliberate exertion, as information should be unyieldingly inferred and “professed”. The declarative statement is identified when a statement is made; when they pass information, and when a sentence always ends with a period. Examples are: Economics is a social science. Demand is the act of requesting for a particular commodity at a time, at a prevailing price. Total cost is the amount of variable and fixed expenses(costs).

In the view of Anderson and Schunn (2000), declarative knowledge represented an array of small parts of simple information called chunks. According to Rittle-Johnson and Alibali (1999), declarative knowledge would now be characterized as express or specific importance of rules that rule a domain and of the associations between bits of information in a sphere. Declarative knowledge is applied when students see the value in how principles are utilized to issues including open and closed frameworks (systems) (Turns and Meter, 2011). It is the cognizance of ideas, tasks and relations among different units. Authoritative information, also called specific information, has been estimated in a huge variety of ways (Rittle-Johnson and Schneider, 2012). It is surveyed with testing frameworks.

As indicated by Rittle-Johnson and Schneider (2012), it is portrayed as the information that is wealthy in relations and can be considered as a connected chain of data, a bunch of organizations wherein the connecting connections are too known as

the discrete snippets of data. Connections penetrate the individual realities and goals so that all snippets of data are connected to some arrangement of associations. Empirically, beginners' conceptual knowledge is frequently parted and should be bound together through learning; specialists' revelatory information proceeds to rise and become better formed (Schneider and Stern, 2009).

2.3.2 Enhanced-declarative knowledge approach (EDKA)

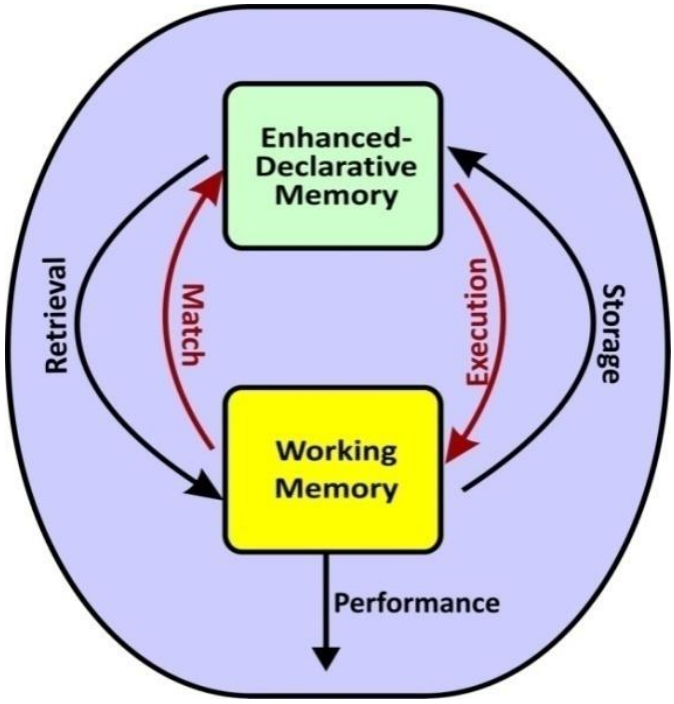


Figure 2.3: Enhanced-Declarative Memory (EDM) Model

SOURCE: Adapted from Anderson and Schunn, 2000

This is human modular cognition model. It involves production process. It contains the knowledge of how to do and perform task skillfully. Thereafter, it generates an outcome in term of new production. This memory is an IF->THEN pattern. This model acts more in solving complex problems.

This model belief that information in the working memory undergo a higher cognition process of matching the current problem with the previous similar challenge, and how it was solved. The model uses examples in the production of new knowledge. At EDM, execution of the new task is carried out and the working memory is furnished with the result. At EDM, unconscious gathering of facts, experiences, events and information that is needed for daily activities are retrieved for working memory while storage of similar encounters are held in EDM

The enhanced-declarative knowledge approach is a superset and advanced step to the declarative knowledge approach that include various features of declarative and higher-order knowledge learning and assessment. It touches both the affective and cognitive domains of students. It is a teaching approach that is meant to increase instructional viability by thinking about the emotional area in arranging courses, conveying talks and exercises, and evaluating student learning. This approach deals with things inwardly, like sentiments, values, appreciation, enthusiasms, inspirations, and attitudes. This is approach stands to reflect the level of concepts mastery and internalisation. This is also a boundless opportunity to demonstrate scenarios (practical examples) and simulations (inferred examples) to observe the students interact with simulated patients.

Enhanced-declarative knowledge (EDK) is the advanced way of consciously providing systematic and experiential information on a particular concept. This instructional approach emphasised real-life experience in teaching and learning and less attention to conceptual meaning. Just like in Rittle-Johnson and Schneider (2012), it follows a succession of phases, or activities, done to realise a goal, while such steps are leading to the derivation of concepts. It is the true-life understanding and information on tangible representations of concepts. In other words, enhanced-declarative memory is about making differences that result in the rational and development of progressively material and immaterial depictions of concepts. In psychology, EDK refers to procedural or experiential information acquired and stored in the memory considered dynamic. EDK, also referred to as concrete or practical information, describes events,

things, or processes; their qualities; and their interaction with one another in practical and factual ways. EDK can be taught using examples, case studies, narrations as well as the use of elaborate analogies. In other words, true-life stories, practical sessions, and empirical facts are all learning strategies employed. A critical element of EDK is that it requires case studies to internalise and solidify knowledge acquisition of concepts. EDK is implicit, which means you know that you know a concept by how it is performed. In teaching, enhanced-declarative learning is acquiring information systematically via psychomotor and affective domains. The explanation and definition of a concept (demand) is an enhanced-declarative piece of information; knowing how to experiment with the concept of *demand* is what EDK is all about. In the meantime, the response format (essay) questions are used in assessing EDK.

The enhanced-declarative memory (EDM), as long-term memory, can be put away as far as statistical data points. EDM depends on the exhibition of an individual. EDMs are realities or recollections of previous occasions that can be 'proclaimed' just as performed. Enhanced-declarative performance is identified when an action is exhibited; and the information on the exhibited action.

When the teaching begins with concepts under this approach, points are driven home with cases, real-life scenarios. Therefore, the knowledge of procedures, which helps in deducing concepts, is known as enhanced-declarative knowledge. Enhanced-declarative knowledge can be defined as action sequences for solving problems to extract the underlying concepts. Enhanced-declarative knowledge is a system containing how to do things skilfully through performance which will eventually lead to knowledge of the factual information on the concept. Effective and skilful learning then takes place through performance and not only by the conscious recall of the experience of the learning process. It is learning by doing which will help learners to assimilate knowledge, technical know-how and attitudes, arouse the dexterity of skills essential to answering problems or carrying out tasks, and enabling the application of new knowledge and often exceptional tasks and problem situations (Kirschner and van Merrienboer, 2009). ‘Enhanced-declarative teaching approach hence forms an integral part of expertise. It is therefore assessed mainly through problem-solving environments. Enhanced-declarative knowledge can be attainedwhen students are permitted to practical experience a series of an event similar to what is being taught in the class in a more relaxing and effective mood.

Thus, it requires line-by-line steps of attaining factual knowledge and skills of doing something appropriately repeatedly. It is, therefore, built on the concept of knowledge, quality and type. This kind of information is created through solution-seeking practices and thus is linked to precise problem categories. The step-by-step sequence thereby leads to a constraint which students' models such as constraint-based model and knowledge tracing model attempt to measure to find out the degree of head information and expertise procurement in the learner. Enhanced-declarative knowledge is thus facilitated by repeated practice of familiar tasks which people have answered previously and thus should know processes for answering and accumulation of logical concepts.

While comparing the skill acquisition of two groups of the strong and weak students, Turns and Meter (2011) noticed that low performing students were less inclined to utilize the technique for attracting part tomahawks to assist them with familiarizing themselves with the heading of powers in the issues. It was then presumed that the difficulties students have with tackling new issues can be respectably ascribed to their feeble information ofprocedures. Berge and Hezewijk (1999) concluded their works that although knowledge of procedure plays a more significant role in the total knowledge-base than declarative knowledge, yet this is not to say that declarative knowledge is unimportant in human understanding of skills possession. This conclusion then justifies the essence of the enhanced-declarative knowledge approach in teaching and learning.

Rittle-Johnson and Schneider (2012) also discovered that even though there is some changeability in how these builds (knowledge of concept and procedure) are measured and defined, it is accepted that the associations between the two kinds of information are often bi- iterative and directional.

2.2.3 Declarative and enhanced-declarative knowledge approaches

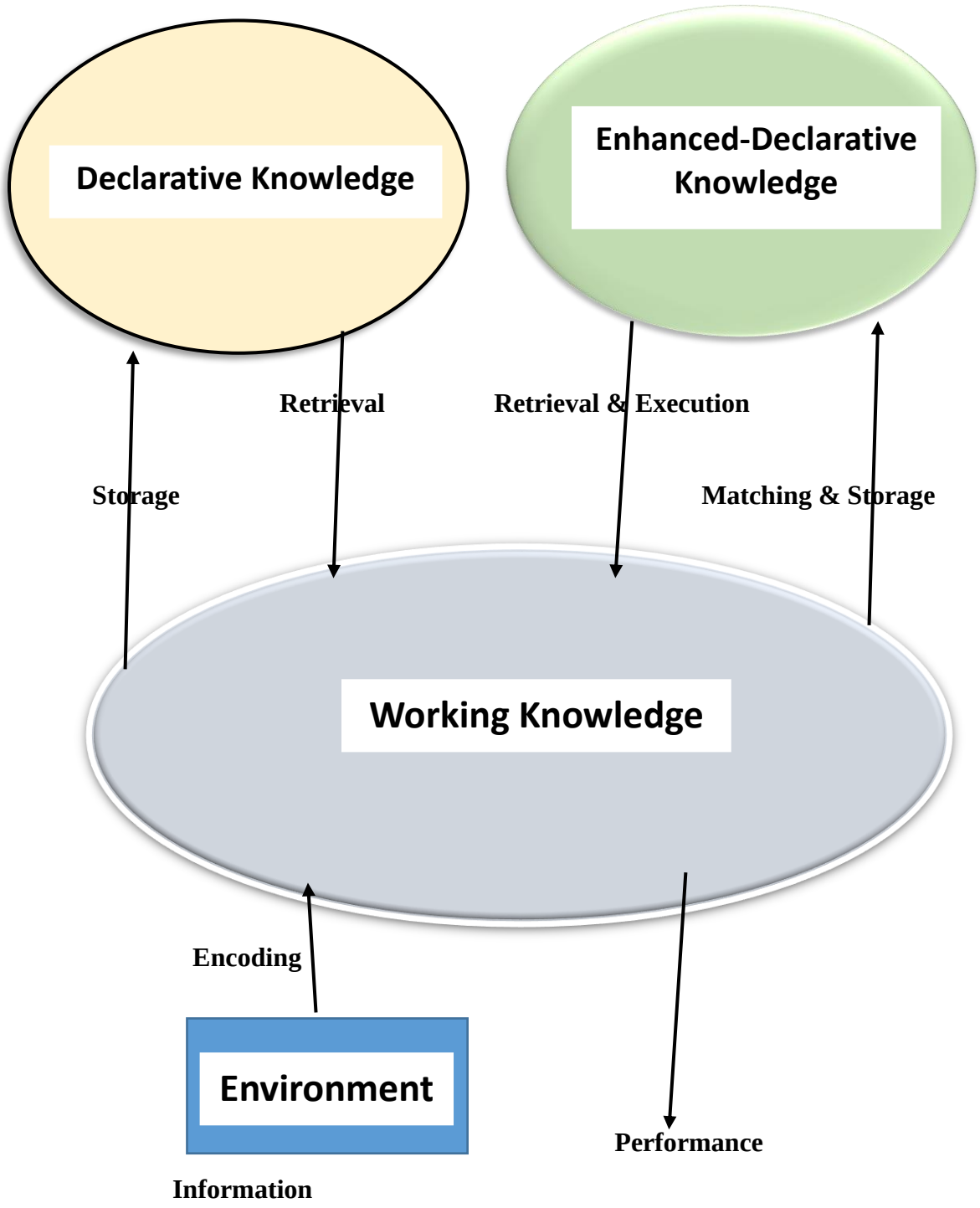


Figure 2.4: Declarative and Enhanced-declarative Memory Model

SOURCE: Adapted from Anderson and Schunn, 2000

Declarative and Enhanced-declarative knowledge approaches are dimensional learning models. According to Rittle-Johnson and Koedinger (2009), declarative information alludes to the information on applicable standards and ideas of certain subjects that can be applied to new tasks (Hernando *et al.*, 2014). On the other hand, enhanced-declarative knowledge is viewed as the procurement of abilities identified with bit by bit activities in taking care of issue setting, which can emanate from tiny declarative ideas or generate ideas formation. Enhanced-declarative knowledge is the capacity to execute the action in successions to tackle issues with minima factual information or resulting in precise information. The knowledge of declarative is *'knowing what*' while enhanced-declarative knowledge is '*knowing how and what or the other way around*'. Conversely, the information on the means needed to accomplish different objectives. The differentiation between declarative and enhanced-declarative information is the capability in how data is addressed in memory.

Declarative portray (for example the information on hypothetical guidelines) implies that students store information in long haul memory as a data set, which appears as a bunch of semantic organizations and an expansive arrangement of interpretative guidelines to utilize the information. At the point when portions of the data are needed to play out a specific activity, a bunch of the overall arrangements is utilized (students deliberately apply the learned principle). Enhanced-declarative information (for example the capacity to utilize the structure effectively without or without monitoring a divided express guideline) is installed in techniques for activity and not kept in a different stock piling region. Right when the design is required, it is there ready to hand – many express undertakings that circuit required data inside them.

In measuring declarative and enhanced-declarative knowledge, it is better to study them separately. Just like the advice offered by Rittle-Johnson and Schneider (2012) concerning the relations between these two knowledge-based teaching (educating) and learning approaches, it is vital to assess the two independently. Proportions of decisive information fluctuate in whether undertakings require understood or specific information on the ideas. Proportions of certain reasonable information are frequently assessment errands on which youngsters settle on an unmitigated decision (e.g., judge the rightness of a model system or answer) and deciphering between authentic organisations (e.g., emblematic parts into pie graphs) and looking at amounts. Unequivocal proportions of calculated information ordinarily

include giving definitions and clarifications. Models incorporate creating or picking definitions for considerations and terms, clarifying why a method works or drawing an idea map. These assignments might be done as paper-and-pencil evaluation or tended to verbally during normalized or clinical social events (Rittle-Johnson and Schneider, 2012). Proportions of improved decisive information do not fluctuate. The assignment frequently takes care of issues, and the outcome is generally the exactness of the appropriate responses or methodology.

While comparing students' level of performance with knowledge of declarative and procedure, Yilmaz and Yalçin (2012) find out that students with knowledge of procedures aremore significant than their explanatory information extent in the laws of motion of Newton. It was further, discovered that the information was better seen in procedural information inquiries than indecisive information questions. Rittle-Johnson and Alibali (1999) also set up a connection among applied and information of the procedure of mathematics equivalence finds out that both conceptual and knowledge of procedure influence one another. The finding shows that adequate and repeated assessment brings about the interconnectivity between the two types of knowledge. While inspecting the connection among reasonable and information on the procedure, Johari, Nor and Mahani (2012) observed a moderate relationship which indicated that the significant p-value of 0.00 was smaller than the value at the significance level of 0.05. This discovery implies a generous connection between descriptive information and information on the method (enhanced-declarative) in tackling issues. Subsequently, students should dominate the two of them to upgrade comprehension and abilities in Chemistry.

In Haapasalo (2012), Lauritzen explored how knowledge of procedure and concept capacity to apply capacities inside monetary and other numerical errands relies upon the two sorts of information. The result was identified with the academic way of thinking applied to the examination of the general population at the upper right hand school. Information was collected at three unquestionable stages, from 476 students in economics points. Verifying element assessment was applied to develop liabilities to actually look at three areas: "procedural information on capacities', 'reasonable information on capacities' and 'the capacity to apply capacities.

The examination uncovered that many subjects scored well in procedural knowledge, be that as it may, unobtrusively in reasonable information. Scores in

calculated data showed up indeed, even lower among those subjects who showed defective procedural information. Regardless, all leaners who scored not settled information scored also high in procedural information. In this way, the outcomes support the hereditary view. Then again, information on method alone by all accounts lacks for the learner to have the option to apply capacities. The instructive foundation of the subjects may have encouraged this result. Meetings demonstrated that the focal point of school instructing had been straight forward methods without connections to extract conceptual knowledge.

2.3.4 Gender influence on learning outcomes and assessment-mode

Gender differences in achievement and cognitive ability have also been examined for some time in a substantial body of literature (Alabi 2008). Gender is concerned with masculinity and femininity as categorised to each sex in society (Ogbeide, 2013). Many studies have taken on gender, attitude and learning outcomeMany studies have taken on gender, attitude and learning outcome. Many differences have been recorded between attitude, interest and learning outcomes of male and female students. Dursun (2015) found in a study that female students' attitude to mathematics lesson is more positive than male students. This result is because their anxiety level is lower than the male students. Gisela (2011) likewise found that male and female students tend to perform differently in various subject areas of education. Aremu (1999) reported that boys performed better than girls in mathematics and other science subjects while Ton (2003) found that girls outperformed boys in some other school subjects.

Also, Fatoba and Aladejana (2014) discovered that gender tends to have no significant effect on students' attitude, but there was a slight difference in their attitude in favour of females. In Ogbeide (2013), it was reported that some subjects are for boys while others are for girls and that Mathematics, for example, is a subject for boys, while Home Economics is for girls. Osakwe (1991) found that girls were superior to boys in spatial conceptualisation in social studies at three levels tested – classification, formal and use of concept level. Demircioglu and Norman's (1999) study showed that gender difference is significant on students' cumulative secondary school grades, whereas gender's effect is not significant on chemistry achievement and chemistry attitudes. Fatoke and Olaoluwa (2014) revealed that male students exhibit a more positive attitude

than female students after exposing them to a self-learning strategy. While considering the influence of attitude towards mathematics and study habit, Choudhury and Das (2012) revealed that boys have high achievement and positive attitude towards mathematics than girls. It was concluded that the student's attitude towards mathematics affects their performance in the subject.

Olatoye and Aderogba (2011) reported that gender of students' achievement in verbal, numerical and general aptitude tests have no significant difference, yet gender inequality in numerical ability has been extensively reported. Bassey, Joshua and Asim (2004) reported that male students performed better than females in numerical ability tests. Archibong (2014) revealed that gender hadno significant effect onstudents' performance of learned concepts (declarative knowledge). Olasehinde and Olatoye (2014) likewise reported that there is no significant difference in students' gender in science achievement and attitude to science. On the other hand, Fatoke, Ogunlade and Ibidiran (2013) findings show that male and female students of high numerical ability levels will perform better than their low ability level counterparts. Also, Nnamani and Oyibe (2016) found a significant difference in gender achievement in their study. The difference was in favour of female students. Similarly, Akinsola and Odeyemi (2014) while reporting on the significance of main effect of gender onstudents' achievement in Mathematics, discovered that male students performed well than females in numerical testing and that this is because male students found the (problem-solving) strategies easy and were able to implement the strategies than their female counterparts.

In another research work, Adigwe (2012) noticed that the male group achieved significantly higher than the female group in Mathematics and chemistry and had significantly higher improvement in both subjects and that high achievement in chemistry which was accompanied by improvement in Mathematics capabilities. Likewise, Ajai and Imoke (2015), in a study on the gender difference in mathematics achievement and retention scores, found female students performing better than male students. The findings, however, showed that the difference was not statistically significant. Douglas (2004) also found girls doing better in English Language and with a particular reference to subjects taught by male teachers. Casey *et al* (2011) (2011) further corroborated that boys performed better than the girls on the spatial–conceptual (declarative) items, whereas girls outperformed the boys on the formula-based items. These findings reinforce the view that spatial–conceptual and formula-based subtests

are best analysed as unique domains of measurement performance but negate the conclusion of Akinsola and Odeyemi (2014) which states that male students performed better than the females in numerical (formula-based) testing.A reported study in Alabi (2008) revealed gender difference in students' assessment attitude when participants were assessed with free-response and multiple-choice problems. The study revealed that female participants preferred esaay type above multiple choice items.

2.3.5 Influence of numerical ability on learning outcome

The numerical ability test is a differential aptitude test (DAT). It is a type of achievement test with which the educational gains of a student is measured. This test appraises numerical reasoning on tasks. Numerical capability tests are purposeful measures to assess the competitors' ability to move or utilize figures to acceptably answer issues (Ann, 2004). Such tests show the necessary number-crunching capacity of a person. It is the capacity to sensibly take care of issues in numbers successively, make exact numerical derivations through cutting edge mathematical insightful, decipher complex information introduced in various graphical structures, surmise data and draw rationalassumptions. It can be administered directly or as a subset test to candidates (Olatoye and Aderogba 2011). Archibong (2014) observed that the prowess in some subjects like Chemistry, Mathematics, Economics, among others, require numerical proficiency to perform effectively. He reported that poor performance in the said subjects is attributed to students' inability to tackle most numerical questions and inadequate exposure to practical activities. This inadequacy then calls for a deep and incisive interest in improving teaching and enhancing students' performance, especially in quantitative Economics problems.

A study by Olatoye and Aderogba (2011) hypothesised a relative effect of students' arithmetic capability on their performance in the inclination/aptitude test. The study finding shows a significant relationship between numerical ability and execution in the overall fitness test. Accordingly, for students to improve in the universally handy inclination test, they should also be excellent numerical. This finding conforms with the result of Drucker (1994), which affirms that mathematical ability will aid students' performance in the same manner subjects. In another study, Okwilagwe and Oyedepo (2007) observed that though students find it challenging to study and understand the quantitative aspects of Economics, Quantitative Economics is very relevant in modern

times and students must do well in it while learning secondary school Economics. Their findings also indicate that mathematical Economics at the secondary school level contributes immensely to learners' achievement in Economics. In essence, the use of quantitative Economics is very pertinent and essential in concretising knowledge acquisitions in this age

In another study, Akinsola and Odeyemi (2014) examined the effects of mnemonic and prior knowledge informative systems on students' mathematics achievement discovered the strongeffect of numeric-crunching ability on students' success in mathematics is weighty. It was indicated that there is an enormous change between low cutoff, medium breaking point and high breaking point on researchers' achievement in Mathematics. The study results uncovered that mathematical capacity seriously affects students' achievement in science, with high arithmetical capacity, got the most extreme mean scores and medium and low mathematical capacity continue toward that path. This suggests that student numerical capacity decides science achievement. That is, the higher the scholar mathematical limit, the higher the satisfaction in arithmetic. Their discoveries further maintained the discoveries of Arowolo (2010) who revealed a tremendous difference in arithmetic success dependent on students' numerical capacity.

Moreover, investigating the numerical ability as the basisfor students' scholarly achievement in secondary school Economics in Oyo State, Adu, Ojelabi and Adeyanju (2009) declared that students with a decent comprehension of proportions of central propensity, Venn chart, and rates had the option to do well in Economics. They expressed further that the achievement was on the grounds that numerical parts have been remembered for the new Economics schedule at the Senior Secondary School Examination level. This affirmation shows that any student who has a decent mathematical stand would handily perform well in any Economics assessment. Also, such a scholar would not drear Mathematics like various students who have no incredible quantitative capacity. Subsequently, the revelations have supplemented the influence of numerical tendency in students' achievements in Economics. Subsequently, for any educator to successfully confer information to the students of Economics, such ought to have the option to investigate how students could foster quantitative capacities. Their investigation then, at that point, approves the after-effects of studies like Adu (2002) and Fatoke, Ogunlade and Ibidiran (2013) which uncovered

high critical quantitative (mathematical) capacity fundamental effect on students' achievement in specific subjects like Economics, Chemistry, Mathematics and Biology. Hence, those students with high mathematical ability will see the value in utilizing mathematical/measurable information and utilize these precisely and innovatively. Notwithstanding, the mathematical score alone is not adequate to gauge students' ability in praises Mathematics which likewise requires a significant degree of theoretical scholarly (Brian, 2016).

2.3.6 Implication of attitude on learning outcomeand assessment-mode

Besides, instructional approach that stands as one of the contributing variables to high or low performance in any subject, students' attitude is another vital dictating factor in students' achievement. According to Sarmah and Puri (2014), attitude is a tendency to respond negatively or positively to issues, views, concepts, situations, objects or other beings. Attitudes stand the chance of being developed and, they can be changed over some time (Syyeda, 2016). The inconsistency of attitude reveals that attitude is not born with human beings. As soon as an attitude is formed, it can make or mar human craves to acquire or reject knowledge. We can then refer to attitude as sentiment, including loyalties and attachment to an individual, ideas or objects (George. 2000). Attitudes become positive when students are ready and willing to learning at a specific point on schedule. As soon as a constructive attitude is built, it can encourage and advance students' learning (Mutai, 2011).

Then again, an unwanted demeanour/attitude blocks dynamic learning and therefore influences the learning item subsequently control the elite among students (Joseph, 2013). In this way, demeanour is a fundamental factor that cannot be disregarded. Moreover, a significant factor responsible for students liking a subject depends heavily on an excellent instructional approach and derived enjoyment (Yılmaz, Altun, and Olkun, 2010). Components of attitudes include the affective component which relates to feelings about an object; behavioural component: which has to do with the tendency to act towards the attitude object undoubtedly; and cognitive module that has to do with views about the attitude object.

In several studies, students'attitudes to mathematics are significantly and directly related to students'attainment. For example, Mensah, Okyere and Kurancie (2013) found a substantial positive link between students' performance and attitude.

Sakariyau, Taiwo and Ajagbe (2016) are reports established a positive connection between students' presentation and mentality towards science schooling. Their discovering additionally uncovered no huge attitudinal distinction among male and female students towards science. Additionally, Nicolaidou and Philippou (2003) discovered that achievement and mentality in arithmetic are fundamentally correlated. It is also against the findings of David, Okorn, Koko, and Bessong (2013), who reported that females had shown negative attitudes than their male counterparts. Likewise, in Rono and Rono (2016), the study revealed that more males like studying History and Government than females. Their report shows that gender is not a determinant basis in shaping learners' attitudes towards History and Government.

Students' assessment-mode attitude seems to have firm attitudes toward diverse testing and evaluation modes (Miron, 2014). Such attitudes ought not to be overlooked since they have a significant influence on students' test performance. Hence, measurement specialists and teachers should consider learners' perceptions and attitudes regarding test setups because they are decent sources of evidence about a test's face validity besides its construct, predictive and content validity. In the same vein, learner's dislikes and likes for a specific test mode have changed very slightly in recent years. As in the past, Multiple-choice items are still generally accepted by students as the most commonly applicable and valuable mode of assessment. In a study, Abu-Dabat (2014) discovered that anoptimistic and sensible connection exists between learners' attitudes and results of the examination in Curriculum and Teaching Methods at the faculty of Arts, Al-Zaytoonah University, Jordan. However, students' attitudes towards the evaluation system did not substantially affect learners' scores in subjects. Another research observed that the test's format has a significant impression on how students learn and what teachers impart. Likewise, in Struyven, Dochy, and Janssens (2005), it was discovered that students' approach to studying is subject to their assessment's perceptions.

2.4 Evaluation of non-fiction and gaps

This study has reviewed the literature on various aspects of the problem of the study. In Nigeria, the learning and teaching of Economics as a subject are very vital for the understanding of how the economy, businesses and personal finances are administered in any modern society. Moreover, for practical, active and constructive

participation, the teaching and learning of Economics ought to go beyond the conventional method. That is why scholars have condemned the practice of traditional teaching style because of its side effect on learners. It was then the consensus of researchers that there should be an active teaching and learning pattern. As observed by various scholars, students need to be taught with various knowledge approaches and should be taught in an interrelated.

As part of the measure to checkmate low performance in Economics, various teaching strategies have been proposed. Among these strategies are declarative and enhanced-declarative knowledge approaches. A research finding concluded that although the knowledge of procedure plays a more significant role in the total knowledge-base than declarative knowledge, it is not necessarily the case that declarative knowledge is unimportant in human understanding of skills possession. It was also discovered that there is often bi-directional and iterative relationships between declarative and knowledge of procedure. While comparing students' level of performance between declarative and procedural, research outcome shows that students procedural information execution is more noteworthy than that of decisive information in laws of motion of Newton. In another study, the research finding also establishes a relation between conceptual and enhanced-declarative knowledge of mathematics. It was discovered that both declarative and enhanced-declarative knowledge influence one another.

In applying these knowledge approaches, it is necessary to put students' numerical ability into consideration. According to scholars, there is a widespread effect of students' mathematical limits on their achievement in the general aptitude test. Several studies corroborated this. It is believed that Economics students can attain mastery learning if a more effective teaching approach on mathematics in Economics is introduced.

Gender disparity in attainment and cognitive ability have also been studied for some time in a considerable body of works. Many studies have taken on gender, attitude and learning outcome. It was discovered that female students' mathematical attitude is more favourable than male; and that in some other school subjects, girls outperformed boys. On the contrary, a scholar reported that girls in mathematics and other science subjects are not better than boys. It was further revealed that boys exhibit a more optimistic attitude than female exposed to self-learning strategies.

Although there are reports that among male and female students' achievement in verbal capacity, mathematical capacity and general fitness tests, there is no significant difference, yet, gender disparity in mathematical ability has been generally testified. A research finding shows that male students showed improvement over females in numerical capacity tests. At the same time, in another study, gender had no substantialinfluence on science attainment, learned concepts and attitude to science students' performance of learned concepts. On the other hand, a report shows that boys and girls students of better numerical ability levels will perform higher than their low ability level counterparts. Similarly, another report on the significance of the directeffect of gender on learners' achievement in Mathematics found that male researchers performed better compared to female partners in mathematical testing and that this is because male found the (critical thinking) approaches simple and can execute the methodologies than their female students.

Several scholarships have been directed on different elements that add to poor performance among students in Nigeria. Also, quite a lot of studies have delved into different teaching methodologies. Teaching approaches, like declarative and enhanced-declarative knowledge approaches, have not been given much attention in addressing the challenges of low students' performance in Nigerian subjects, particularly economics. This then means that there is a paucity of studies in the area of declarative and enhanced-declarative knowledge approaches locally. This challenge had been taken up to unravel the meaningful contributions of these approaches by this study. Few studies have, however, experimented with any of these knowledge approaches. Although some existing studies outside the country have reported a positive effect of these approaches, they left some apparent vacuum unfilled. An instance in the literature has shown three areas of a different focus. These include the division between the two knowledge approaches in memory; the cognitive sciences which concentrate more on knowledge of procedure and its relation with declarative knowledge; and more insight that can be gained by analysing the way the mechanisms for declarative knowledge evolved from those dedicated to the knowledge of the procedure.

In the meantime, another similar study had suggested that future research should centre on more demanding measurement of descriptive (declarative) and knowledge of the procedure, which should provide proof for the authenticity of the methodology, and propose all the more comprehensive models for seeing how revelatory and procedural

information is created. This examination then, at that point, took a gander at working on students' exhibition. Consequently, this study had examined the effect of declarative and enhanced-declarativeknowledge approaches on learning outcome in quantitative Economics contents in senior secondary schools in Oyo town.

CHAPTER THREE

METHODOLOGY

The research method that was adopted in this study was categorised under the following sections:

3.1 Research design

This study employed a 3 X 3 X 2 factorial non-randomised pre-test, post-test, control group of quasi-experimental design.

As an experimental study, a 3 X 3 X 2 factorial, pre-test post-test control group design, as shown in table 3.1, was used to investigate the influence of independent and moderating variables on the dependent variables based on the established effect of each independent variable.

Table 3.1: 3x3x2 Factorial Design

Numerical Ability	**Treatment**					
	Declarative Knowledge Approach		Enhanced-declarative Knowledge Approach		Conventional Knowledge Approach	
	Gender		**Gender**		**Gender**	
	Male	Female	Male	Female	Male	Female
High						
Medium						
Low						

3.1.1 Variables of the study

The study focussed on the following variables. These were:

The independentvariables- Treatment operated at two levels with one control group.

i. Declarative Knowledge approach
ii. Enhanced-declarativeKnowledge approach
iii. Conventional Knowledge approach (Control)

The dependentvariables were:

i. Students'learning attitude
ii. Students'assessment-mode attitude
iii. Students' achievement in Economics

Moderator variables: Two moderator variables were also built-in.

1. Numerical ability (operated at three levels)
   i. High
   ii. Medium
   iii. Low
2. Students' gender (operated on two levels)
   i. Male
   ii. Female

3.2 Population

The focused population for the analysis were thirty-seven (37) public secondary schools, five thousand seven hundred and sixty-six (5,766) SS 2 students offering Economics in three(3) Local Government Areas (LGAs) of Atiba, Oyo East and Oyo West, Oyo town.

3.3 Sampling technique and sample

Sampling was performed in two phases: the sampling technique and samples were obtained as follows:

3.3.1 Sampling technique

Phase 1: Sampling for diagnostic test

The selection of one local government was based on purposive sampling

technique. This is because it is the only local government that is not part of Oyo township. At random, three schools were selected out of seventeen public secondary schools in the local government. In the selected schools, intact classes were used to administer an Economics diagnostic test to S.S. three students who had been taught the content when they were in S.S. 2. A total number of ninety-seven students took part in the diagnostic test.

Phase 2: Sampling for the study

The selection of threeLocal Government Areas (LGAs) of Atiba, Oyo East and Oyo West was purposively done. This is because the three Local Government Areas form Oyo township. Three public secondary schools were purposively chosen from three LGAs that satisfy the following criteria:

i. They were all co-educational schools;
ii. They hadfull time and qualified teachers of Economics for SS 1 and SS 2; and
iii. The schools that had presented candidates for the SSCE in Economics for at the very least five consecutive years.

3.3.2 Sample for the study

Intact classes from nine selected schools were used, and treatment was randomly assigned to the three schools from the selected local governments. The three treatments cut across the three local government areas. In treatment group one, there were sixty-four participants. Fifty-three participants belong to treatment group two, while ninety-two participants belong to group three. In all, two hundred and nine students partook in the study in the three local governments of Atiba, Oyo East and Oyo West. Moreover, in each selected LGA, the three treatment groups were used for experimentation.

3.4 Instrumentation

Five instruments were adapted, adopted, pooled and used in this study. These included:

a. Economics Diagnostic Test (EDT)
b. Numerical Ability Test (NAT)

c. Quantitative Economics Achievement Test (QEAT)
d. Economics Students' Learning Attitude Scale (ESLAS)
e. Economics Students' Assessment Attitude Scale (ESAAS)

Two tutors' teaching manuals were developed and used for the study, namely:

a. Declarative Knowledge Approach Manual (DKAG Manual)
b. Enhanced-Declarative Knowledge Approach Manual (EDKAG Manual)

3.4.1 Economics students' learning attitude scale (ESLAS)

ESLAS was an adapted version of Lee's (2013) SASS (Students' Attitudinal Scale for Statistics). SASS was a twenty-four items instrument, but ESLAS contains twenty-nine items drawn and modified to suit Economics. This instrument can be found on Appendix I. Section A, the first part of ESLAS, contained both introduction and demographic information associated with respondents, while section B consisted of the main 29 items focusing on respondents' learning attitudes. The section was responded to with a 4-point Likert-type scales (Strongly Agree, Agree, Disagree and Strongly Disagree). The instrument's reliability co-efficient and steadiness were determined via Cronbach Alpha at 0.82.

3.4.2 Economics students' assessment-mode attitude scale (ESAAS)

ESAAS was an adapted version of Mussawy's (2009) SPAQ (Students' Perception of Assessment Questionnaire). SPAQ was a 24-item instrument, but ESAAS contains 31-items drawn and modified to suit Economics. This instrument can be found on Appendix II. The first part (Section A) of ESAAS included both introduction and demographic information associated with respondents, while section B was based on the main 31 items focusing on respondents' assessment attitude. The section was responded to using a Likert-type gauge of Four-point (Strongly Agreed, Agreed, Disagreed and Strongly Disagreed). Cronbach Alpha's reliability co-efficient and consistency of the instrument was determined at 0.89.

3.4.3 Economics diagnostic test (EDT)

This instrument was used to identify contents to be treated for this study. Furthermore, this instrument was a survey instrument that contained 50-objective and 4-essay questions, which were administered to the then S.S. 3 students in a non-selected

local government area of Afijio to identify complex contents in the S.S. 2 curriculum. Objective and essay questions for this instrument were pooled from the WAEC past questions while the researcher constructed one of the essay items. Thetest was analysed with frequency count to verify the inappropriate contents.This instrument can be found on Appendix III.

In the selection of this diagnostic test, the following criteria were considered. The diagnostic test:

a. was appropriately related to the information and abilities distinguished in the educational program;
b. was moulded to offer data that would help in distinguishing students' requirements and focusing on enhancements;
c. identified qualities and slums in students' information and abilities, and gave bits of proof from which derivations about students' learning was made;
d. was proper in content, plan and method of conveyance;
e. provided a scope of designated approaches that instructors used to design the subsequent stages in guidance and students' learning; and
f. formed part of a decent and exhaustive evaluation framework that gave itemized proof of every learner's turn of events.

Tables 3.2 and 3.3 contain the test blueprint for the diagnostic test.

Table 3.2: Test blueprint for economics diagnostic test (EDT- Objectives)

Contents	Knowledge 50%	Understanding 25%	Thinking 25%	Row Total	%
Production	32, 34, 48	33, 35, 40, 46	31, 37, 38	**10**	**20**
Demand and Supply	3, 24	2, 4, 5, 8, 9 10, 12, 14, 17, 18, 22, 23, 27	15, 20, 21, 26, 29	**20**	**40**
Taxation	28	6, 11, 13, 16, 25, 30	1, 7, 19	**10**	**20**
Concept of Cost and Revenue	36	41, 47	39, 42, 43, 44, 45, 49, 50	**10**	**20**
Column Total	**7**	**25**	**18**	**50**	**100**

Table 3.3: Test blueprint for economics diagnostic test (EDT- Essay)

Contents	Knowledge 50%	Understanding 25%	Thinking 25%	Row Total	%
Production		3bi, ii	3ai,ii,iii	5	**14.29**
Demand and Supply			1ai,ii,iii, 1bi,ii,iii	6	**17.14**
Taxation		2bi,ii	2ai,ii,iii,iv,v,vi, 2ci[i-iv], 2cii [i-iv]	16	**45.71**
Concept of Cost and Revenue			4ai,ii, 4bi,ii, 4ci,ii, 4di,ii	8	**22.86**
Column Total		**4**	**31**	**35**	**100**

3.4.4 Quantitative economics achievement test (QEAT)

This instrument was an achievement instrument used to assess students' performance in both objective and essay items. The objective and essay questions for this study were adopted for use from the West African Examinations Council (WAEC) past questions series from 1988 to 2015. Fifty objectives and four essay items were extracted while 30 objective and two essay items were used on the study participants with four choices A-D. Selected items were based on the curriculum meant for S.S. 2 students. Students were given forty minutes to answer both the objective and essay items. This instrument can be found on Appendix IV.

The questions for both essay and objective items covered selected quantitative content areas of Economics applicable to SS 2 students. These include Production, Demand and Supply, Taxation and the conceptsof Cost and Revenue. With the construction of test blueprints, the researcher ensured that the items covered knowledge, understanding and thinking levels in the cognitive domain at predetermined weighting. KR-20, was utilised to determine the dependability coefficient, and 0.96 was the obtained coefficient.

Tables 3.4 and 3.5 contained the proposed test blueprint for the achievement test, while the final blueprint was decided after the diagnostic test.

Table 3.4: Test blueprint for quantitative economics achievement test (QEAT- Objective)

Contents	Knowledge 50%	Understanding 25%	Thinking 25%	Row Total	%
Taxation	18, 25, 28	6, 9, 11, 15, 20, 22, 29, 30	2, 27	**14**	**46.7**
Concept of Cost and Revenue	3, 14, 16, 17, 24	4, 7, 8, 10, 12, 14, 21, 23	1, 5, 19	**16**	**53.5**
Column Total	**6**	**17**	**4**	**30**	**100**

Table 3.5: Test blueprint for quantitative economics achievement test (QEAT- Essay)

Contents	Knowledge 50%	Understanding 25%	Thinking 25%	Row Total	%
Taxation	2a		2bi, ii, iii	**4**	**50**
Concept of Cost and Revenue			1a,b,c,d	**4**	**50**
Column Total	**1**	**0**	**7**	**24**	**100**

3.4.5 Numerical ability test (NAT)

Nine items were used to assess the numerical strength of the participants. This instrument can be found on Appendix V. Participants were classified into three numerical ability categories (High, Medium and Low). The test was administered during the pre-test only. The test was validated and the reliability coefficient was 0.81 with Kudar Richardson (KR-20).

3.4.6 Teaching manual

The researcher developed the teaching manual for the two experimental groups. The package served while the leading suggestions were to be delivered by research aides for uniformity of purpose in the treatment groups. The researcher provided the guide in line with the treatment groups' characteristics and the selected quantitative contents to be taught in the study. The teaching manual can be found on Appendices VI and VII.

3.4.7 Procedures for determining difficult quantitative contents

Survey (identification of difficult contents in S.S. 2 curriculum)

The researcher carried out a task analysis on four quantitative Economics contents applicable to S.S. 2 students. A 50-item diagnostic test was pooled and adopted from the WAEC past question series from 1988 to 2015 for testing difficult contents and the ability of the current S.S. 3 students who had been taught with the four selected quantitative contents (that is Production, Demand and Supply, Taxation and the concepts of Cost and Revenue.) taught in the S.S 2 curriculum. This test was calibrated on the S.S. 3 students to ascertain and identify contents that need to be taught to S.S. 2 students during the application of treatments. The diagnostic test was analysed with descriptive statistics in order to verify the difficulty of each item.

The test was conducted on S.S. 3 students offering Economics in threerandomly selected public schools in Afijio local government. Ninety-sevenstudents partook in the task analysis; descriptive analysis was used, and the result shows that the concepts of cost and revenue top the list of the difficulty contents followed by taxation, as shown in Figure 3.1.

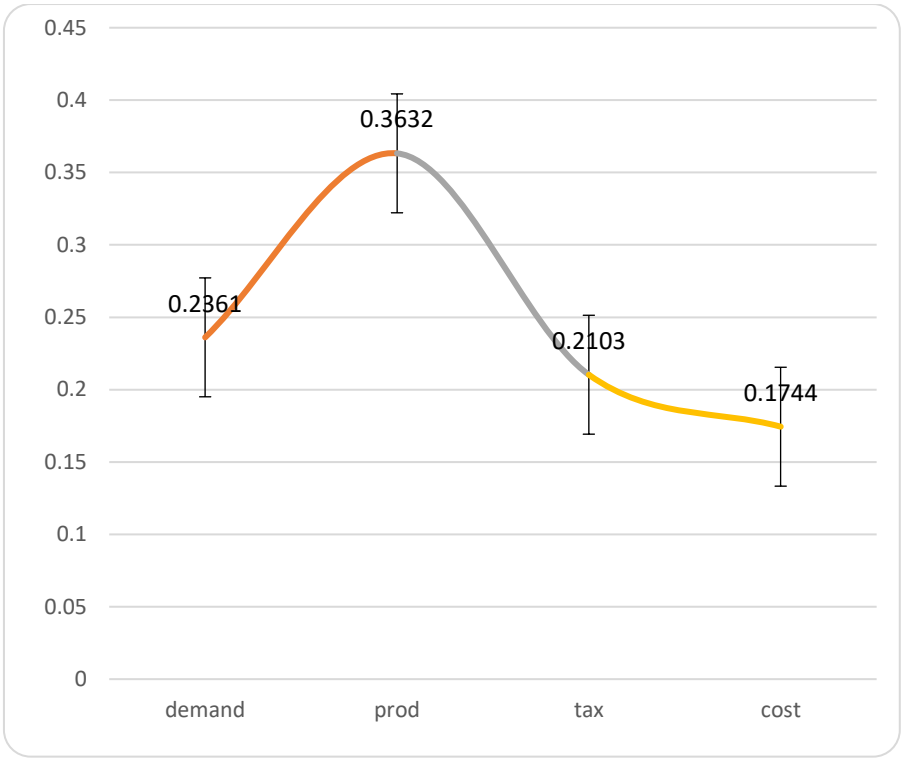


Figure 3.1: Line chart showing the degree of content difficulty

The following procedures were used to executethe experimental aspect of the study:

1. There was an interaction between the researcher and the subject teachers, who served as research assistants.
2. Proposed teachers were briefed and taught on using the tutor's manual for the respective treatment groups.
3. Teaching and learning lasted six weeks in all the groups.
4. Eleven contacts were made during the periods of the experiment. Two contacts were for the administration of ESLAS, ESAAS, NAT and QEAT at pre and post-tests, while the remaining nine contacts were for treatment.
5. The treatments were randomly assigned to the three groups of participants.

Apart from the general procedures discussed above, the treatment packages for the three groups are presented below:

Treatments: -

The treatment lasted for six weeks. In groups 1 and 2, topics and contents were treated based on treatment group guidelines. In group three (control group), the teaching took the conventional mode, and the research assistant did it. Topics were grouped under two categories, and each category has four content units (see Appendix VIII). Each topic had two lessons per week which lasted for 40 minutes. After the treatment, QEAT, ESLAS and ESAAS were re-administered as post-tests.

Treatment Group 1: Declarative knowledge approach group (DKAG)

Prepared teaching manual was used to teach this group (Appendix VI). The following were the features of this group:

1. Group 1 was a concept-based teaching approach and learning was acquired through the knowledge of concepts.
2. Group 1 was an expository approach group, where factual and exact information, features, terminologies, properties, phenomena, principles, concepts and procedures are used in teaching the content.
3. Learners were asked to cite their own examples using the criteria to organise and apply information.

Mode of teaching in DKA

1. In this group, after the introduction of the content to be taught, the objectives of the lesson were made known to students;
2. Teachers initiated the teaching by explaining the fundamental component of the concept;
3. At least two students were allowed to provide practical examples using the explained concept;
4. After that, the teacher of this group defined the concept;
5. Objective items were administered on students for class practice;
6. The previous home assignment was reviewed alongside the class practice.

The flow chart of the teaching and practice of declarative knowledge approach group

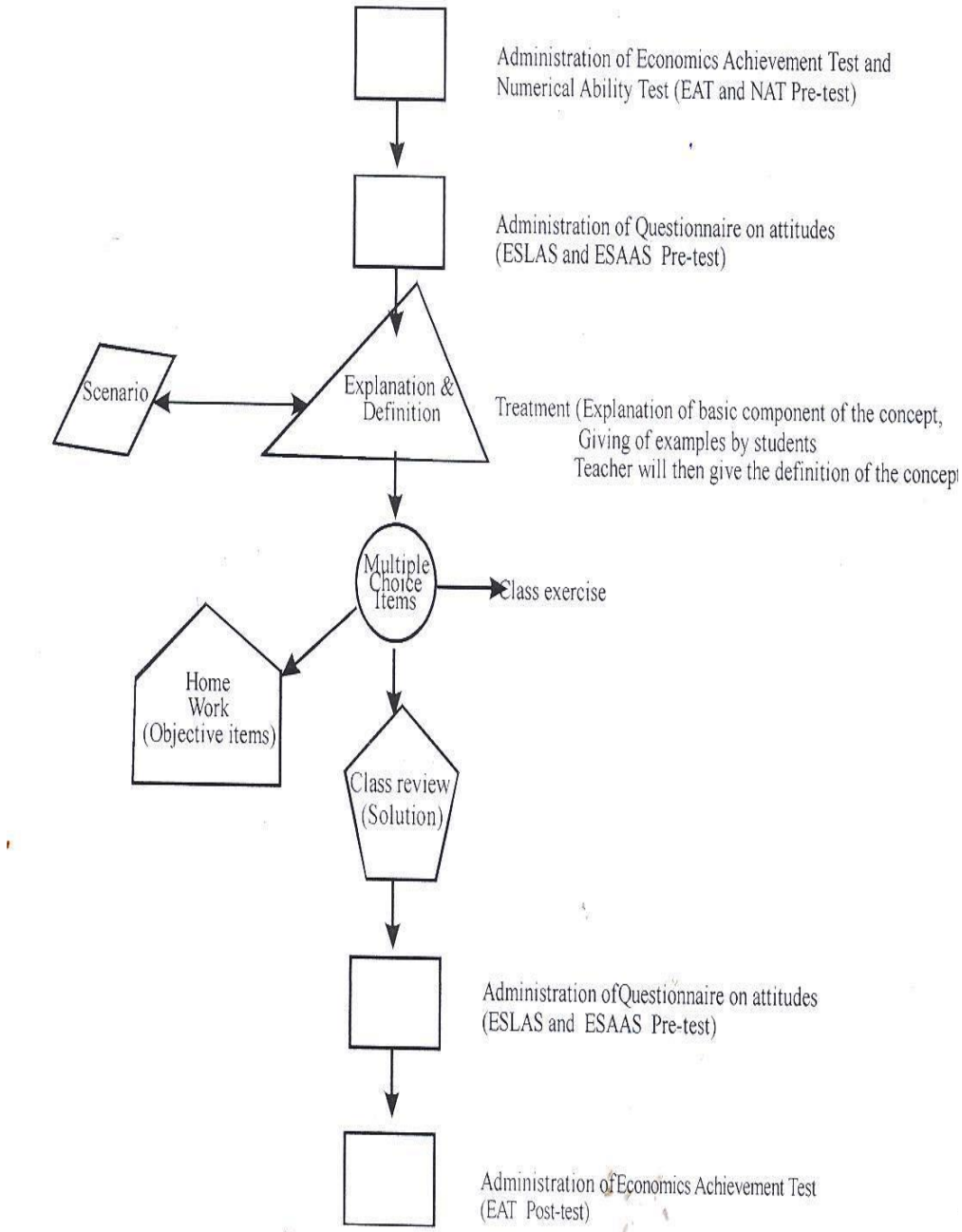


Figure 3.2: Diagrammatic representation of the experimental procedure for declarative knowledge approach.

SOURCE: Adapted from Adeleke 2007

Treatment Group 2: Enhanced-declarative knowledge approach (EDKA)

The teaching manual for this group can be found on Appendix VII.The following characterised this group

1. This was a case-based and performance-based approach group. Real experiential and analytical teaching was adopted for this group.
2. The teaching approach that was adopted here was role-played, narration, activity and experience-centred approach.

Mode of teaching in EDKA

1. In the treatment group, after the introduction of the content to be taught, objectives of the teaching were made known to students;
2. The teacher initiated the teaching either with case studies, role-play, activities, narration, practical experience or problem-solving media by explaining the fundamental component of the concept;
3. Based on the scenarios used by the teacher, two (2) students were asked to derive or deduce the definition of the discussed concept in their way.
4. After that, the teacher buttress on the meaning supplied by students;
5. Class practice in the form of assessment was then followed using objective and short essay items;
6. The previous home assignment was reviewed alongside the class practice.

The flow chart of the teaching and practice of enhanced-declarative knowledge approach group

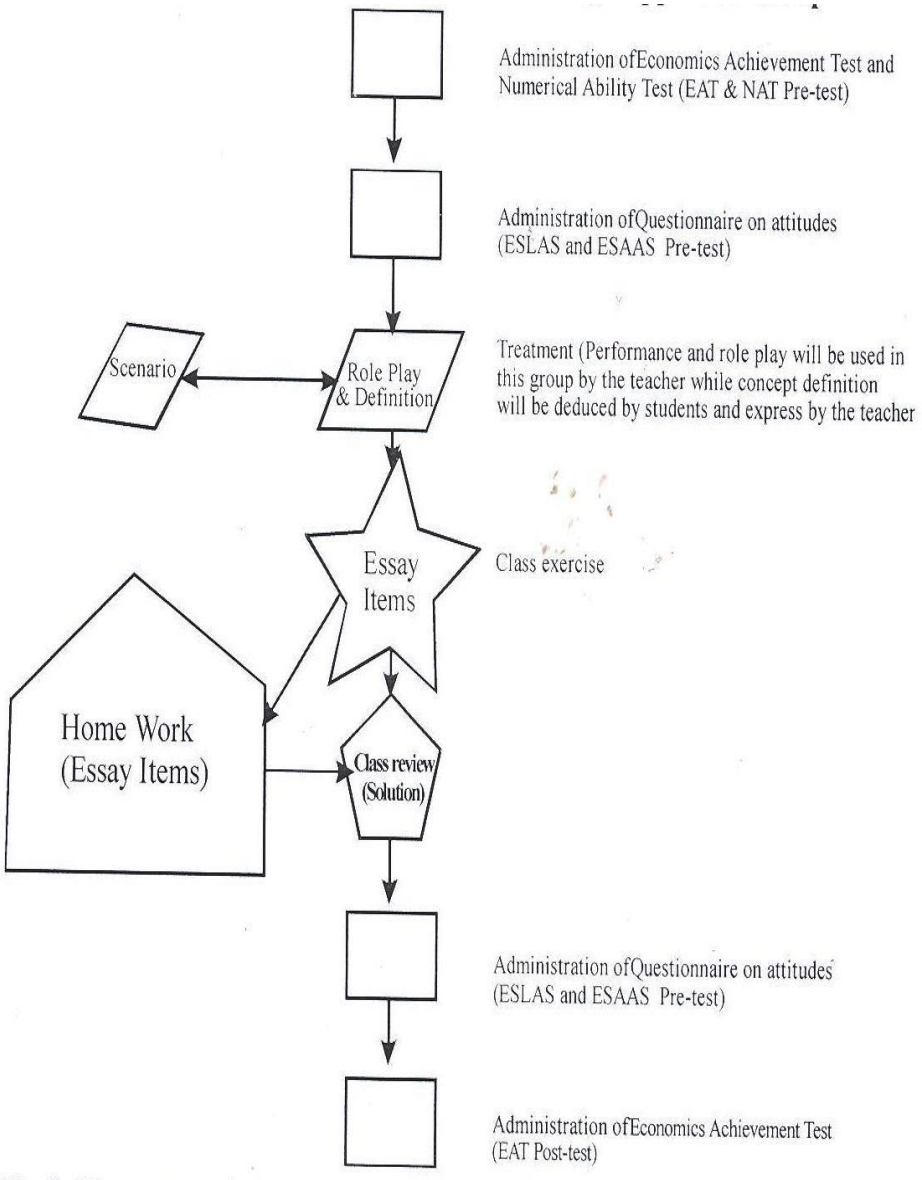


Figure 3.3: Diagrammatic representation of the experimental procedure for enhanced-declarative knowledge approach.

SOURCE: Adapted from Adeleke 2007

Treatment Group 3: Conventional knowledge approach group (CKAG)

1. In this group, after the introduction of the content that was taught, the objectives of the lesson were made known to students;
2. Teachers took charge of every activity, explaining and giving examples to students in the course of the teaching;
3. Students copied the given note;
4. After the teaching, the class practice was marked by students.

The flow chart of the teaching and practice of the conventional knowledge approach group

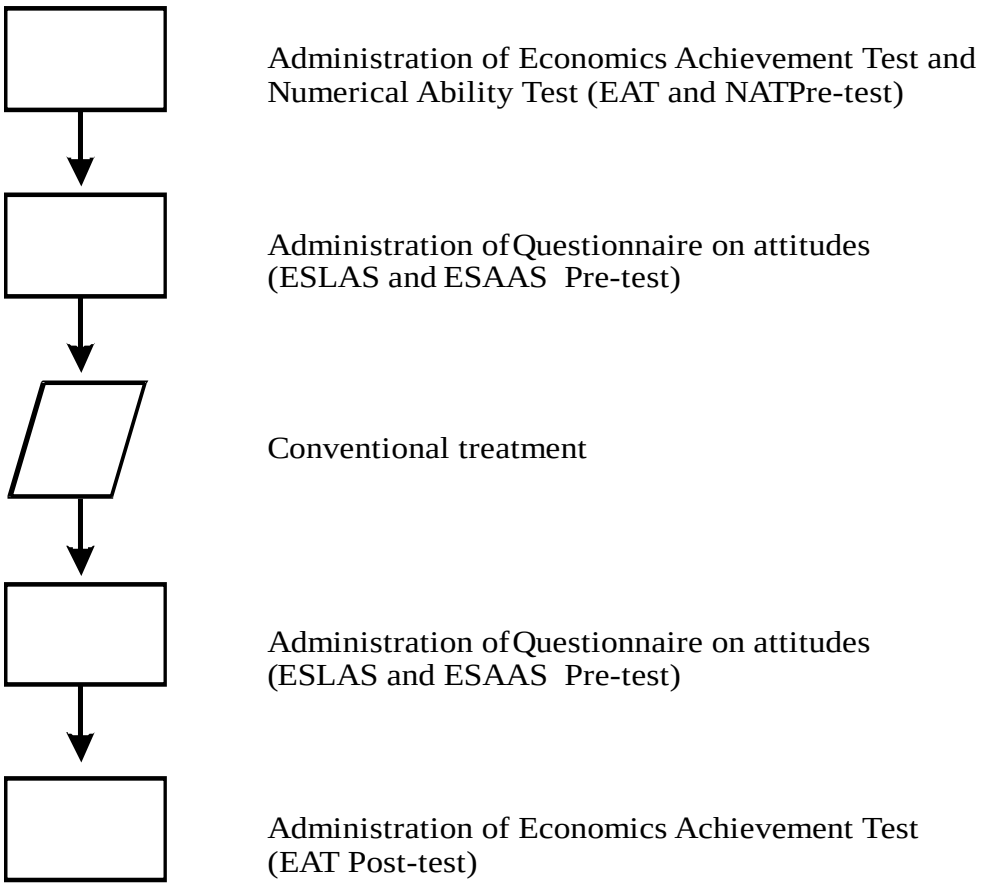


Figure 3.4: Diagrammatic representation of the conventional knowledge approach.

SOURCE: Adapted from Adeleke 2007

3.4.8 Validation of teaching modules and instrument

One research student and two WAEC examiners teaching Economics in non-selected schools examined the modules for face validity. The researcher's supervisor and one other lecturer also examined the instruments for expert judgement. When the tools were adjudged suitable, trial testing was conducted on SS 2 students other than the selected school.

3.5 Trial testing and validation of objective and essay items

Both objective and essay items were pooled from the WAEC past questions in Economics, and they were handed over to three (3) SSSCE examiners and two long-serving Economics teachers for face and content validity. Validity was done to ensure that there was no ambiguity in items that were considered for use.

3.6 Scoring and item selection

The researcher marked and scored students' Numerical Ability Tests. The selection into numerical ability levels was based on performance in NAT. The scores were ranked from the most noteworthy/highest to the least/lowest. Those who score above the upper quartile formed the high ability group. Those below the lower quartile were in the lower ability group while those in the middle constituted the medium ability group. Objective and essay questions (QEAT) at both pre and post-tests were also be scored using WAEC marking guides. Economics Students' Learning Attitude Scale and Economics Students' Assessment-mode Attitude Scale were equally scored. The positive items on the instrument were scored based on a weighted value of 4 through 1, while the opposite was the actual value for negative items. The total score earned by each student on ESLAS and ESAAS were taken completely to correspond to the students' level of attitude.

3.7 Data collection procedure

The permission and an introductory letter was granted to the researcherby the Zonal Head of TESCOM, Oyo, to all selected schools' principals. A sample copy of the letter is in Appendix X. The presentation of the letter enabled the full cooperation and support of the schools involved. Nine research collaborators were prepared and given the guideline for the administration of the items. Six were for treatment groups

while three were for the control group. The period for the application of the treatment lasted for six weeks.

3.8 Data analysis

Responses of SS 2 students in the test and questionnaires formed the basis for data analysis. The posttest performance scores of participants were validated via Analysis of Covariance (ANCOVA) using the pre-tests as covariates at 0.05 degree of significance.

ANCOVA was used on seven hypotheses using the pretreatment assessment scores as covariates. Sidak posthoc test was run on any main effect observed to be significant to decide the degree and course connected with the effect and to set up the measure of variety because of each dependent variable.

Items in ESLAS and ESAAS were analysed with SPSS. Table 3.6 illustrated how the hypotheses were analysed.

Table 3.6: Hypotheses and their method of data analysis

S/N	Research hypotheses	Method of data analysis
1	Ho1:	ANCOVA
2	Ho2:	ANCOVA
3	Ho3:	ANCOVA
4	Ho4:	ANCOVA
5	Ho5:	ANCOVA
6	Ho6:	ANCOVA
7	Ho7:	ANCOVA

3.9 Methodological challenges

Like many other experimental studies, the researcher had few challenges while executing the methodological aspect. The challenges are as follow:

i. Experimental mortality resulting in insufficient sample size for statistical measurement due to withdrawal of some participants at the posttest level of the research, thereby reducing the sample size of the study.
ii. Scarcity and insufficiency of previous research studies and findings locally on the research title is another challenge, which made the researcher to depend on foreign literature.

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Results

Following the sequence in which the hypotheses were stated, the study's outcome is presented in this chapter. All hypotheses were evaluated at a 0.05 significance level.

4.1.1 Ho1: There was no significant main effect of treatment (declarative and enhanced-declarative, and conventional knowledge approaches) on

i. students' achievement;
ii. students' learning attitudes; and
iii. students' assessment-mode attitudes in quantitative Economics.

4.1.1.1 Ho1: The main effect of treatment is not significant (declarative and enhanced-declarative and conventional knowledge approaches) on students' achievement in quantitative Economics.

Table 4.1.1.1: Summary ofANCOVA of Students'Achievement in Quantitative Economics by Gender and Numerical Ability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected model	3925.94	14	280.42	8.82	0.00	0.39
Intercept	4084.53	1	4084.53	128.42	0.00	0.40
Achievement_pretest	14.90	1	14.90	0.47	0.50	0.00
Main effects						
Group	1250.41	2	625.20	19.66	0.00	0.17
Gender	169.58	1	169.58	5.33	0.02	0.03
Numerical ability	1117.40	2	558.70	17.57	0.00	0.15
Two-way effects						
Group * gender	56.99	2	28.50	0.90	0.41	0.01
Group * numerical ability	88.01	2	44.00	1.38	0.25	0.01
Gender * numerical ability	141.27	2	70.64	2.22	0.11	0.02
Three-way effects						
Group * gender * numerical	77.74	2	38.87	1.22	0.30	0.01
Error	6170.51	194	31.81			
Total	57663.00	209				
Corrected total	10096.45	208				

a. R Squared = 0.39 (Adjusted R Squared =0.35)

The result of one-way ANCOVA for the main effect of treatment (declarative and enhanced-declarative and conventional knowledge approaches) on students' achievementis presented in Table 4.1.1.1. It shows that after adjusting for pre-achievement scores, the result reveals a significant main effect of the treatment on students' achievement ($F_{(2,194)}p<0.05$, $\eta 2 = 0.17$). Cohen's *d* categorisation of effect size are small (d =0.2), medium (d =0.5) and large ($d \geq 0.8$). The effect size on the level of significance in accordance with Cohen's *d* for the group is 0.17 which is small. Hence, the null hypothesis was not accepted. This suggests that the effect of treatment is significant on students' achievement in quantitative economics. In Table 4.1.1.2, the posthoc multiple comparisons of means are presented.

Table 4.1.1.2: Estimated Marginal Means for Post-Achievement Scores of Various Treatment Groups

Groups	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Declarative	11.61	0.87	9.90	13.31
Enhanced-declarative	19.07	0.82	17.45	20.69
Control	15.98	1.15	13.71	18.25

ACH_PRETEST = 12.32

Table 4.1.1.2 reveals that the students in the Enhanced-declarative team had the maximum adjusted mean score ($\bar{x}$ =19.07) followed by the Control group ($\bar{x}$ =15.98), and then the Declarative group which had the lowest adjusted mean score ($\overline{X}$=11.61). This order can be represented as an Enhanced-Declarative > Control > Declarative group. Moreover, the Sidak posthoc test of multiple comparisons was employed to trace the sources of significant difference obtained in Table 4.1.1.3.

Table 4.1.1.3: Posthoc Multiple Comparisons of Post Achievement Scores by Treatment Groups

(I) Groups	(J) Groups	Mean Diff (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
					Lower Bound	Upper Bound
Declarative	Enhanced-declarative	-7.47	1.23	0.00	-10.43	-4.50
	Control	-4.37	1.51	0.01	-8.02	-0.73
Enhanced-	Declarative	7.47	1.23	0.00	4.50	10.43
	Control	3.09	1.39	0.08	-0.26	6.45
Control	Declarative	4.37	1.51	0.01	0.73	8.02
	Enhanced-declarative	-3.09	1.39	0.08	-6.45	0.26

Table 4.1.1.3 reveals the mean score in students' achievement from the post-hoc analysis. The EDG cut across various groups. The result implies that EDG was not the same as the other two groups, while the mean scores of the other two groups (DG and CG) were unique in relation to one another also.

4.1.1.2 Ho1: The main effect of treatment is not (declarative and enhanced-declarative and conventional knowledge approaches) on students' learning attitudes in Economics:

Table 4.1.2.1: Summary of ANCOVA of Students' Learning Attitude in Quantitative Economics by Gender and Numerical Ability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected model	1258.62	14.00	89.90	1.01	0.44	0.07
Intercept	11460.21	1.00	11460.21	129.28	0.00	0.40
Learn_att_pretest	185.89	1.00	185.89	2.10	0.15	0.01
Main effects						
Group	121.25	2.00	60.63	0.68	0.51	0.01
Gender	7.77	1.00	7.77	0.09	0.77	0.00
Numerical ability	165.67	2.00	82.83	0.93	0.40	0.01
Two-way effects						
Group * gender	240.13	2.00	120.07	1.35	0.26	0.01
Group * numerical ability	13.27	2.00	6.64	0.08	0.93	0.00
Gender * numerical ability	118.89	2.00	59.45	0.67	0.51	0.01
Three-way effects						
Group * gender * numerical	127.87	2.00	63.94	0.72	0.49	0.01
Error	17197.81	194.00	88.65			
Total	1556147.00	209.00				
Corrected total	18456.43	208.00				

a. R Squared =0.07 (Adjusted R Squared = 0.00)

The result of one-way ANCOVA for the main effect of treatment (declarative and enhanced-declarative and conventional knowledge approaches) on students' learning attitude is presented in Table 4.1.2.1.It shows that after adjusting for pre-learning attitude scores, the result reveals an insignificant main effect of the treatment on students' learning attitude ($F_{(2,194)}$ $p>0.05$, $\eta 2 = 0.01$). Hence, the null hypothesis was not rejected. This implies that treatment has no significant effect on students' learning attitudes.

Table 4.1.2.2: Estimated Marginal Means for Post-Learning Attitude Scores of Various Treatment Groups

Groups	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Declarative	85.48	1.29	82.95	88.02
Enhanced-declarative	84.99	1.36	82.30	87.68
Control	87.28	1.87	83.59	90.97

LEARN_ATT_PRETEST = 87.44.

Table 4.1.2.2 reveals that the students in the Control team possessed the highest adjusted meanscore($\bar{X}$ =87.28), followed by the Declarative group ($\bar{X}$ =85.48), and then the Enhanced-declarative group, which had the lowest adjusted mean score ($\bar{X}$ =84.99). This order can be represented as Control group > Declarative > Enhanced-declarative.

4.1.1.3 Ho1: The main effect of treatment is not significant (declarative and enhanced-declarative and conventional knowledge approaches) on students' assessment-mode attitude in quantitative Economics.

Table 4.1.3.1: Summary of ANCOVA of Students' Assessment-mode Attitude in Quantitative Economics by Gender and Numerical Ability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected model	6855.35	14.00	489.67	3.00	0.00	0.18
Intercept	24317.03	1.00	24317.03	148.99	0.00	0.43
Assess_att_pretest	3978.05	1.00	3978.05	24.37	0.00	0.11
Main effects						
Group	686.55	2.00	343.27	2.10	0.13	0.02
Gender	63.00	1.00	63.00	0.39	0.54	0.00
Numerical ability	61.54	2.00	30.77	0.19	0.83	0.00
Two-way effects						
Group*gender	9.66	2.00	4.83	0.03	0.97	0.00
Group*numerical ability	246.37	2.00	123.19	0.76	0.47	0.01
Gender*numerical ability	105.57	2.00	52.79	0.32	0.72	0.00
Three-way effects						
Group*gender*numerical ability	361.19	2.00	180.60	1.11	0.33	0.01
Error	31663.10	194.00	163.21			
Total	1403780.00	209.00				
Corrected total	38518.45	208.00				

a. R Squared =0.18 (Adjusted R Squared = 0.12)

The result of one-way ANCOVA for the main effect of treatment (declarative and enhanced-declarative and conventional knowledge approaches) on students' assessment-mode attitude is presented in Table 4.1.3.1. After adjusting for pre-assessment-mode attitude scores, the result reveals an insignificant main effect of the treatment on students' assessment attitude ($F_{(2,194)}$ $p>0.05$, $\eta 2 = 0.02$). Hence, the null hypothesis was not rejected**.** This implies that treatment has no significanteffect on students' assessment-mode attitudes.

Table 4.1.3.2: Estimated Marginal Means for Post-Assessment-mode Attitude Scores of Various Treatment Groups

Groups	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Declarative	79.30	1.76	75.82	82.77
Enhanced-Declarative	84.52	1.84	80.89	88.16
Control	81.76	2.54	76.75	86.77

ASSESS_ATT_PRETEST = 79.35.

Table 4.1.3.2 reveals that the students in the Enhanced-Declarative group (EDG) had the uppermost adjusted mean score ($\bar{X}$ =84.52) followed by the Control group (CG) ($\bar{X}$ =81.76), and then the Declarative group (DG), which had the lowest adjusted mean score ($\bar{X}$ =79.30). This order can be represented as Enhanced-declarative > Control group > Declarative.

4.1.2 Ho2: There was no significant main effect of gender on:

i. students' achievement;
ii. students' learning attitudes; and
iii. students' assessment attitudes in quantitative Economics.

4.1.2.1 Ho2: There is no significant main effect of gender on students' achievement in quantitative Economics.

The outcome of a one-way ANCOVA for the main effect of gender on students' achievement reveals a significant main effect of gender on students' achievement ($F_{(1,194)}$ $p<0.05$, $\eta 2 = 0.03$) after adjusting for pre-achievement scores in Table 4.2.1.1. The effect size on the level of significance in accordance with Cohen's *d* is 0.03 which is small. Therefore, the null hypothesis is rejected. This means that gender has significant effect on students' achievement in quantitative economics. The estimated marginal means for post-achievement score of gender are as follows:

Table 4.2.1.1: Estimated Marginal Means for Post-Achievement Scores of Gender

Gender	Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
Male	14.35	1.01	12.37	16.33
Female	16.88	0.58	15.74	18.02

ACH_PRETEST = 12.32.

The female students had the maximum adjusted mean value ($\bar{x}$ =16.88) while male students had ($\bar{x}$ =14.35), as revealed in Table 4.2.1.1. This order can be represented as Female > Male. As a follow up, Sidak posthoc test of multiple contrasts was engaged to trace the sources of significant difference in achievement obtained in Table 4.2.1.2.

Table 4.2.1.2: Post-hoc Multiple Comparisons of Post-Achievement Scores by Gender

(I) Gender		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
					Lower Bound	Upper Bound
Male	Female	-2.53	1.16	0.03	-4.83	-0.24
Female	Male	2.53	1.16	0.03	0.24	4.83

The posthoc analiysis' result in Table 4.2.1.2 reveals that the mean score in students' achievement was as a result of the female which cut across the gender. The result implies that females' performance was better than that of male participants.

4.1.2.2 Ho2: The main effect of gender on students' learning attitude in quantitative Economics is not significant:

After adjusting for pre-learning attitude scores, the result of one-way ANCOVAreveals that there is no significant main effect of gender on students' learning attitude ($F_{(1,194)}$ $p>0.05$, $\eta 2 = 0.00$) in Table 4.2.1.1.Thus, there is no need of rejecting the null hypothesis. This means that gender has no significant effect on students' learning attitude in quantitative economics. The estimated marginal mean score obtained are in Table 4.2.1.1:

Table 4.2.1.3: Estimated Marginal Means for Post-Learning Attitude Scores of Gender

Gender	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Male	86.42	1.67	83.12	89.72
Female	85.80	0.97	83.90	87.70

LEARN_ATT_PRETEST = 87.44.

Table 4.2.1.3 reveals that male students had the highest adjusted mean value ($\bar{x}$ =86.42) whereas female students had ($\bar{x}$ =85.80). This order can be represented as male > female.

4.1.2.3 Ho2: The main effect of gender on students' assessment-mode attitude in quantitative Economics is not significant.

After adjusting for pre-assessment-mode attitude scores, the result of a one-way ANCOVA reveals that there is no significant main effect of gender on students' assessment-mode attitude ($F_{(1,194)}$ $p>0.05$, $\eta 2 = 0.00$) in Table 4.2.3.1. Hence, the null hypothesis is not rejected. This implies that gender has no significant effect on students' assessment-mode attitude in quantitative economics. The estimated marginal mean score obtained are in Table 4.2.3.1

Table 4.2.3.1: Estimated Marginal Means for Post-Assessment-mode Attitude Scores of Gender

Gender	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Male	81.05	2.27	76.58	85.52
Female	82.64	1.30	80.07	85.22

ASSESS_ATT_PRETEST = 79.35.

The female students had the highest adjusted mean score ($\bar{x}$ =82.64) in Table 4.2.3.1 while male students had ($\bar{x}$ =81.05). This order can be represented as Female > Male.

4.3 **Ho3:** There was no significant main effect of numerical ability on:

i. students' achievement;

ii. students' learning attitudes; and

iii. students' assessment-mode attitudes in quantitative Economics.

4.1.3.1 Ho3: The main effect of numerical ability is not significant on students' achievement in quantitative Economics.

The outcome of a one-way ANCOVA for the numerical ability's main effect on students' achievement reveals a significant main effect of numerical ability on students' achievement ($F_{(2,194)}$ $p<0.05$, $\eta 2=0.02$) after adjusting for pre-achievement scores in Table 4.1.1.1. The effect size on the level of significance in accordance with Cohen's *d* for the group is 0.02 which is small. Therefore, the null hypothesis is rejected. This means that numerical ability has significant effect on students' achievement in quantitative economics. The estimated marginal means for the post-achievement score of numerical ability are presented in Table 4.3.1.1.

Table 4.3.1.1: Estimated Marginal Means for Post-Achievement Scores of Numerical Abilities

Groups	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
High ability	17.19	1.12	14.97	19.40
Medium ability	16.20	0.67	14.88	17.51
Low ability	9.16	1.00	7.18	11.14

ACH_PRETEST = 12.32.

Table 4.3.1.1 reveals that students with highability levelhad the highest numerical value ($\bar{x}$ =17.19). This is followed by medium ability students ($\bar{x}$ =16.20), while low ability students had the lowest numerical value ($\bar{x}$ =9.16). This order can be represented as a high ability > medium ability >low ability. In addition, Sidak posthoc test of multiple contrasts was employed to trace sources of significant difference obtained in Table 4.3.1.1.

Table 4.3.1.2: Posthoc Multiple Comparisons of Post Achievement Scores by Numerical Ability

(I) Numerical Ability		Mean Difference (I-J)	Std. Error	Sig	95% Confidence Interval for Difference	
					Lower Bound	Upper Bound
High ability	Medium ability	0.99	1.31	0.83	-2.16	4.14
	Low ability	8.02	1.51	0.00	4.39	11.65
Medium ability	High ability	-0.99	1.31	0.83	-4.14	2.16
	Low ability	7.04	1.21	0.00	4.13	9.94
Low ability	High ability	-8.02	1.51	0.00	-11.65	-4.39
	Medium ability	-7.04	1.21	0.00	-9.94	-4.13

The result from the posthoc analysis reveals that the mean score in students' numerical ability was a result of the high ability, which cut across various numerical levels in Table 4.3.1.2. The result implies that high ability was different from the other two levels. In comparison, the mean scores of the other two levels (medium and low) were altogether not the same as one another also.

4.1.3.2 Ho3: The main effect of numerical ability is not significant on students' learning attitude in quantitative Economics.

After adjusting for pre-learning attitude scores, the result of one-way ANCOVA reveals that there is no significant main effect of the numerical ability on students' learning attitude ($F_{(1,194)}$ $p>0.05$, $\eta 2 = 0.01$) in Table 4.1.2.1. Therefore, the null hypothesis was not rejected. This means that numerical ability has no significant effect on students' learning attitude in quantitative economics.

Table 4.3.2.1: Estimated Marginal Means for Post-Learning Attitude scores of Numerical Abilities

Numerical levels	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
High ability	86.42	1.88	82.71	90.14
Medium ability	86.22	1.10	84.04	88.40
Low ability	84.84	1.68	81.52	88.16

LEARN_ATT_PRETEST = 87.44.

Table 4.3.2.1 reveals that the students with high ability had the maximum adjusted mean score ($\bar{X}$ =86.42) followed by medium ability students ($\bar{X}$ =86.22), while students with low ability had the least adjusted mean score ($\bar{X}$ =84.84). This order can be represented as a highability > medium ability >low ability.

4.1.3.3 Ho3:The main effect of numerical ability is not significant on students' assessment-mode attitude in quantitative Economics.

After adjusting for pre-assessment attitude, the one-way ANCOVA for the main effect of numerical capacity on students' assessment mode attitude($F_{(2,194)}$ $p>0.05$, $\eta 2 = 0.00$) is not significant. Hence, the null hypothesis is not rejected ccepted. This implies that numerical ability has no significant effect on students' assessment-mode attitude in quantitative economics. The estimated marginal mean score for the post-assessment attitude of numerical ability ispresented in Table 4.3.3.1.

Table 4.3.3.1: Estimated Marginal Means for Post-Assessment-mode Attitude Scores of Numerical Abilities

Numerical levels	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
High ability	82.21	2.55	77.19	87.24
Medium ability	82.02	1.50	79.06	84.97
Low ability	80.24	2.30	75.71	84.76

ASSESS_ATT_PRETEST = 79.35.

Table 4.3.3.1. the maximum adjusted mean ($\bar{X}$ =82.21) is traced to the students with high ability level,followed by medium ability students ($\bar{X}$ =82.02) while the lowest numerical mean value is found with low ability students ($\bar{X}$ =80.24). This order can be represented as a high ability > medium ability >low ability.

4.4 Ho4: There was no significant interaction effect of treatment (declarative and enhanced-declarative and conventional knowledge approaches) and gender on:

i. students' achievement;
ii. students' learning attitude; and
iii. students' assessment-mode attitude in quantitative Economics.

4.1.4.1 Ho4: The interaction effect of treatment and gender is not significant on students' achievement:

The two-way ANCOVA for the interaction effect of treatment and gender on students' achievement score ($F_{(2,194)}$ $p>0.05$, $\eta 2 = 0.01$) was not significant adjusting for the pre-achievement score in Table 4.1.1.1. Hence, the null hypothesis is not rejected. This means that the interaction effects of treatment and gender have no significance on students' achievement in quantitative economics. The estimated marginal mean score of post achievement score for treatment and gender can be found in Table 4.4.1:

Table 4.4.1: Estimated Marginal Means for Post-Achievement Scores of Treatment and Gender

Groups	Gender	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Declarative	Male	11.14	1.26	8.65	13.64
	Female	12.07	1.04	10.02	14.12
Enhanced-declarative	Male	18.83	1.29	16.29	21.38
	Female	19.31	1.01	17.32	21.30
Control	Male	13.50	2.08	9.40	17.59
	Female	18.47	0.97	16.55	20.39

ACH_PRETEST = 12.32.

The students of the enhanced-declarative group had the uppermost adjusted mean score of both male and female ($\bar{X}$ =18.83 & 19.31 respectively) followed by the control group with a mean score of male and female students ($\bar{X}$ =13.50 & 18.47 respectively). In contrast, declarative group students had the lowest adjusted mean score of male and female ($\bar{X}$ =11.14 & 12.07 respectively) in Table 4.4.1. This order can be represented as enhanced-declarative > control > declarative groups.

4.1.4.2 Ho4: The interaction effect of treatment and gender is not significant on students' learning attitude.

The result of a two-way ANCOVA in Table 4.1.2.1 for the interaction effect of treatment and gender on students' learning attitude ($F_{(2,194)}$ $p>0.05$, $\eta 2 = 0.01$) was not significantafter adjusting for pre-learning attitude. Hence, the null hypothesis is not rejected. This implies that the interaction effects of treatment and gender have no significance on students' learning attitude in quantitative economics. The estimated marginal mean score of post learning attitude for treatment and gender are as follows.

Table 4.4.2: Estimated Marginal Means for Post-Learning Attitude Scores of Treatment and Gender

Groups	Gender	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Declarative	Male	83.69	2.00	79.75	87.63
	Female	87.27	1.62	84.08	90.47
Enhanced-declarative	Male	86.07	2.15	81.83	90.31
	Female	83.91	1.67	80.62	87.20
Control	Male	88.48	3.38	81.82	95.13
	Female	86.08	1.63	82.87	89.28

LEARN_ATT_PRETEST = 87.44.

Table 4.4.2 reveals that, in control group, male students had the maximum adjusted mean score ($\bar{X}$ =88.48), followed by female students of declarative group ($\bar{X}$ =87.27). In declarative group, male students has the minimum adjusted mean score($\bar{X}$ =83.69).

4.1.4.3 Ho4: The interaction effect of treatment and gender is not significant on students' assessment-mode attitude.

The outcome of a two-way ANCOVA in Table 4.1.3.1for the interaction effect of treatment and gender on students' assessment-mode attitude ($F_{(2,194)}$ $p>0.05$, $\eta 2=0.00$) was not significant after adjusting for pre-assessment attitude. The null hypothesis, therefore, was accepted. This means that the interaction effect of treatment and gender have no significance on students' assessment-mode attitude in quantitative economics. The estimated marginal mean score for the post assessment-mode attitude of treatment and gender are inTable 4.4.3.

Table 4.4.3: Estimated Marginal Means forPost-Assessment-mode Attitude Scores of Treatment and Gender

Groups	Gender	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Declarative	Male	77.99	2.73	72.61	83.36
	Female	80.60	2.21	76.25	84.95
Enhanced-declarative	Male	83.84	2.94	78.04	89.65
	Female	85.21	2.26	80.75	89.66
Control	Male	81.23	4.58	72.20	90.25
	Female	82.30	2.22	77.93	86.67

ASSESS_ATT_PRETEST = 79.35.

Table 4.4.3 reveals that male and female students of the enhanced-declarative group had the maximum adjusted mean score ($\bar{X}$ =83.84 & 85.21 respectively) followed by male and female students of the control group with an adjusted mean score of $\bar{X}$ =81.23 and 82.30 respectively. Least adjusted mean scores were found in male and female students of the declarative group ($\bar{X}$ =77.99 & 80.60 respectively).

4.5 Ho5: There was no significant interaction effect of treatment and numerical ability on:

i. students' achievement;
ii. students' learning attitude; and
iii. students' assessment attitude in quantitative Economics.

4.1.5.1 Ho5: The interaction effect of treatment and numerical ability is not significant on students' achievement in quantitative Economics.

After adjusting for the pre-achievement score, the outcome of a two-way ANCOVA for the interaction effect of treatment and numerical ability in Table 4.1.1.1 on students' achievement value ($F_{(2,194)}$ $p>0.05$, $\eta 2 = 0.01$) is not significant.The null hypothesis, therefore, was not rejected. This means that the interaction effects of treatment and numerical ability have no significance on students' achievement in quantitative economics. The estimated marginal means for post-achievement score of treatment and numerical ability can be found in Table 4.5.1.

Table 4.5.1: Estimated Marginal Means for Post-Achievement Scores of Treatment and Numerical Abilities

Groups	Numerical Levels	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Declarative	High ability	12.44	0.97	10.53	14.34
	Medium ability	10.78	1.32	8.18	13.38
	Low ability	6.20	0.67	4.88	7.51
Enhanced-declarative	High ability	18.28	1.04	16.23	20.33
	Medium ability	19.87	1.27	17.37	22.37
	Low ability	17.19	1.12	14.97	19.40
Control	High ability	20.84	3.11	14.70	26.98
	Medium ability	17.94	0.97	16.03	19.85
	Low ability	9.16	1.00	7.18	11.14

ACH_PRETEST = 12.32.

Table 4.5.1 shows that students with high ability in controlgroup ($\bar{X}$ =20.84) had the maximum adjusted mean value. This is followed by students of medium ability level in enhanced-declarative group ($\bar{X}$ =19.87) while students of high ability level in declarative group ($\bar{X}$ =12.44) had the least adjusted mean value.

4.1.5.2 Ho5: The interaction effect of treatment and numerical ability is not significant on students' learning attitude in quantitative Economics.

The result of a two-way ANCOVA for the interaction effect of treatment and numerical ability on students' learning attitude ($F_{(2,194)}$ $p>0.05$, $\eta 2 = 0.00$) is not significant after adjusting for the pre-achievement score in Table 4.1.2.1. Thus, the null hypothesis is not rejected. This implies that the interaction effect of treatment and numerical ability have no significance on students' learning attitude in quantitative economics. The estimated marginal means for the postlearning attitude of treatment and numerical ability are in Table 4.5.2.

Table 4.5.2: Estimated Marginal Means for Post Learning Attitude Scores of Treatment and Numerical Abilities

Groups	Numerical Levels	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Declarative	High ability	85.27	1.49	82.33	88.22
	Medium ability	85.69	2.12	81.50	89.88
	Low ability	83.21	2.50	75.19	84.24
Enhanced-declarative	High ability	84.68	1.74	81.25	88.11
	Medium ability	85.30	2.09	81.18	89.42
	Low ability	81.02	1.57	79.57	85.97
Control	High ability	89.32	5.16	79.14	99.50
	Medium ability	87.67	1.45	84.80	90.53
	Low ability	84.84	1.68	81.52	88.16

LEARN_ATT_PRETEST = 87.44.

Table 4.5.2 shows that control group had maximum adjusted mean score of high, medium and low ability levels ($\bar{X}$ =89.32, 87.67 & 84.84) followed by declarative group levels ($\bar{X}$ =85.27, 85.69 & 83.21) while the enhanced-declarative group had the lowest adjusted mean value ($\bar{X}$ =84.68, 85.30 & 81.02).

4.1.5.3 Ho5: The interaction effect of treatment and numerical ability is not significant on students' assessment-mode attitude in Economics.

The result of a two-way ANCOVA for the interaction effect of treatment and numerical ability on students' assessment-mode attitude ($F_{(2,194)}$ $p>0.05$, $\eta 2 = 0.01$) is not significant after adjusting for pre-assessment mode attitude in Table 4.1.3.1. Therefore, the null hypothesis is not rejected. This means that the interaction effects of treatment and numerical ability have no significance on students' assessment-mode attitude in quantitative economics. The estimated marginal mean score for the post-assessment attitude of treatment and numerical ability is as follows.

Table 4.5.3: Estimated Marginal Means for PostAssessment-mode Attitude Scores of Treatment and Numerical Ability

Groups	Numerical Levels	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Declarative	High ability	77.36	1.98	73.46	81.26
	Medium ability	81.23	2.89	75.53	86.93
	Low ability	81.05	2.27	76.58	85.52
Enhanced-declarative	High ability	83.76	2.36	79.11	88.41
	Medium ability	85.29	2.83	79.71	90.88
	Low ability	82.64	1.30	80.07	85.22
Control	High ability	85.52	7.00	71.72	99.33
	Medium ability	79.53	1.97	75.65	83.40
	Low ability	80.24	2.30	75.71	84.76

ASSESS_ATT_PRETEST = 79.35.

Table 4.5.3 reveals that, in control group, high ability students had the maximum adjusted mean score ($\bar{X}$ =85.52), followed by students with medium ability level of Enhanced-declarative group ($\bar{X}$ =81.23) while students with high ability level in Declarative group have the lowest mean score ($\bar{X}$ =77.36).

4.6 **H_o6:** There was no significant interaction effect of gender and numerical ability on:

i. students' achievement;

ii. students' learning attitudes; and

iii. students' assessment mode attitudes in quantitative Economics.

4.1.6.1 H_o6: The interaction effect of gender and numerical ability is not significant on students' achievement score in quantitative Economics.

The result of a two-way ANCOVA for the interaction effect of gender and numerical ability on students' achievement score ($F_{(2,194)}$ $p>0.05$, $\eta 2 = 0.02$) was not significant after adjusting for the pre-achievement score. Hence, the null hypothesis is not rejected. This means that the interaction effects of gender and numerical ability have no significance on students' achievement in quantitative economics. The estimated marginal means for post-achievement scores of gender and numerical ability are as follows.

Table 4.6.1: Estimated Marginal Means for Post-Achievement Scores of Gender and Numerical Abilities

Gender	Numerical Levels	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Male	High ability	14.84	2.01	10.87	18.82
	Medium ability	16.28	1.05	14.21	18.36
	Low ability	7.06	1.70	3.70	10.41
Female	High ability	19.53	1.05	17.47	21.59
	Medium ability	16.11	0.81	14.52	17.70
	Low ability	11.27	1.07	9.16	13.38

ACH_PRETEST = 12.32.

Table 4.6.1 reveals that high ability female students had the highest adjust mean score ($\bar{X}$ =19.53) while the low ability male students had the least adjusted mean score ($\bar{X}$ =7.06).

4.1.6.2 Ho6: The interaction effect of gender and numerical ability is not significant on students' learning attitude in quantitative Economics.

The result of a two-way ANCOVA for the interaction effect of gender and numerical ability on students' learning attitude ($F_{(2,194)}$ $p>0.05$, $\eta 2 = 0.01$) is not significant after adjusting for pre-learning attitude in Table 4.1.2.1.Hence, the null hypothesis is not rejected. This implies that the interaction effects of gender and numerical ability have no significance on students' learning attitude in quantitative economics. The estimated marginal means for the post-learning attitude of gender and numerical ability are in Table 4.6.2.

Table 4.6.2: Estimated Marginal Means for Post Learning Attitude Scores of Gender and Numerical Abilities

Gender	Numerical Levels	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Male	High ability	87.61	3.36	81.00	94.23
	Medium ability	85.36	1.76	81.90	88.83
	Low ability	86.02	2.84	80.41	91.63
Female	High ability	85.24	1.70	81.88	88.59
	Medium ability	87.07	1.35	84.42	89.73
	Low ability	83.67	1.79	80.14	87.19

LEARN_ATT_PRETEST = 87.45.

Table 4.6.2 reveals that high ability male students had maximum adjusted mean scores($\bar{X}$ =87.61) while female students withlow ability level had the lowest adjusted mean score ($\bar{X}$ =83.67).

4.1.6.3 Ho6: The interaction effect of gender and numerical ability is not significant on students' assessment-mode attitude in quantitative Economics.

The outcome of a two-way ANCOVA for the interaction effect of gender and numerical ability on students' assessment-mode attitude ($F_{(2,194)}$ $p>0.05$, $\eta 2 = 0.00$)was not significant after adjusting for pre-assessment attitude in Table 4.1.3.1.Thus, the null hypothesis is not rejected. This implies that the interaction effects of gender and numerical ability have no significance on students' assessment-mode attitude in quantitative economics. The estimated marginal means for the post-assessment attitude of gender and numerical ability can be found in Table 4.6.3:

Table 4.6.3: Estimated Marginal Means for Post-Assessment-mode Attitude Scores of Gender and Numerical Abilities

Gender	Numerical Levels	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Male	High ability	80.07	4.54	71.11	89.02
	Medium ability	82.18	2.38	77.48	86.88
	Low ability	80.60	3.87	72.97	88.24
Female	High ability	84.36	2.31	79.81	88.92
	Medium ability	81.85	1.81	78.28	85.43
	Low ability	79.87	2.43	75.08	84.66

ASSESS_ATT_PRETEST = 79.35.

Table 4.6.3 shows that high ability female students had the highest adjusted meanscore ($\bar{X}$ =84.36) while low ability female students had the least mean value ($\bar{X}$ =79.87).

4.7 Ho7: There was no significant interaction effect of treatment, gender and numerical ability on:

i. students' achievement;
ii. students' learning attitudes; and
iii. students' assessment-mode attitudes in quantitative Economics.

4.1.7.1 Ho7: The interaction effect of treatment, gender and numerical ability is notsignificant on students' achievement in quantitative Economics.

The result of a three-way ANCOVA for the interaction effect of treatment, gender and numerical ability on students' achievement score ($F_{(2,194)}$ $p>0.05$, $\eta 2 = 0.01$) was not significant after adjusting for the pre-achievement score. Hence, the null hypothesis is not rejected. This implies that the interaction effects of treatment, gender and numerical ability have no significance on students' achievement in quantitative economics. The estimated marginal means for the post-achievement score of treatment, gender and numerical ability are presented in Table 4.7.1.

Table 4.7.1: Estimated Marginal Means for Post-Achievement Score of Treatment, Gender and Numerical Abilities

Groups	Gender of Respondents	Numerical Level	Mean	Std. Error	95% Confidence Interval	
					Lower Bound	Upper Bound
Declarative	Male	High ability	11.30	1.40	8.55	14.06
		Medium	10.98	2.02	6.99	14.97
		Low ability	11.27	1.07	9.16	13.38
	Female	High ability	13.57	1.20	11.20	15.94
		Medium	10.58	1.61	7.40	13.76
		Low ability	7.06	1.70	3.70	10.41
Enhanced-declarative	Male	High ability	17.97	1.63	14.76	21.18
		Medium	19.70	2.00	15.76	23.63
		Low ability	17.19	1.12	14.97	19.40
	Female	High ability	18.59	1.29	16.03	21.14
		Medium	20.04	1.55	16.98	23.10
		Low ability	18.28	1.04	16.23	20.33
Control	Male	High ability	15.26	5.74	3.94	26.59
		Medium	18.17	1.49	15.23	21.11
		Low ability	7.06	1.70	3.70	10.41
	Female	High ability	26.42	2.54	21.41	31.44
		Medium	17.71	1.08	15.59	19.84
		Low ability	11.27	1.07	9.16	13.38

ACH_PRETEST = 12.32.

Table 4.7.1 shows that high ability female students, in control group, obtained the maximum adjusted mean score ($\bar{X}$ =26.42). This is followed by female students with medium ability level ($\bar{X}$ =20.04) in enhanced-declarative group ($\bar{X}$ =10.58) while female students with low ability level in declarative group had the lowest mean score ($\bar{X}$ =7.06).

4.1.7.2 Ho7: The interaction effect of treatment, gender and numerical ability is not significant on students' learning attitude in quantitative Economics.

After adjusting for pre-learning attitude, the result of a three-way ANCOVA for the interaction effect of treatment, gender and numerical ability on students' achievement score $F_{(2,194}$ $p>0.05$, $\eta 2 = 0.01$) was not significant in Table 4.1.2.1. Hence, the null hypothesis is accepted. This implies that the interaction effects oftreatment, gender andnumerical ability have no significance on students' learning attitude in quantitative economics. The estimated marginal means for the post learning attitude of treatment, gender and numerical ability can be found in Table 4.7.2:

Table 4.7.2: Estimated Marginal Means for Post Learning Attitude Scores of Treatment, Gender and Numerical Abilities

Groups	Gender	Numerical Level	Mean	Std. Error	95% Confidence Interval	
					Lower Bound	Upper Bound
Declarative	Male	High ability	83.01	2.22	78.63	87.39
		Medium	84.37	3.33	77.80	90.94
		Low ability	81.02	1.57	79.57	85.97
	Female	High ability	87.54	1.94	83.72	91.35
		Medium	87.01	2.62	81.84	92.19
		Low ability	85.69	2.12	81.50	89.88
Enhanced-declarative	Male	High ability	86.24	2.72	80.87	91.60
		Medium	85.91	3.33	79.34	92.48
		Low ability	84.68	1.74	81.25	88.11
	Female	High ability	83.12	2.16	78.85	87.39
		Medium	84.70	2.57	79.79	89.65
		Low ability	82.22	1.57	79.57	85.97
Control	Male	High ability	93.60	9.42	75.01	112.18
		Medium	85.81	2.37	81.14	90.49
		Low ability	86.02	2.84	80.41	91.63
	Female	High ability	85.05	4.21	76.74	93.35
		Medium	89.52	1.69	86.18	92.85
		Low ability	83.67	1.79	80.14	87.19

LEARN_ATT_PRETEST = 87.44.

Table 4.7.2 shows that high ability male students in control group had the maximum adjusted mean score($\bar{X}$ =93.60). This is followed by female students with medium ability in control group ($\bar{X}$ =89.52) while male students with low ability level in declarative group had the least mean score ($\bar{X}$ =81.02).

4.1.7.3 Ho7: The interaction effect of treatment, gender and numerical ability is not significant on students' assessment-mode attitude in quantitative Economics.

The result of a three-way ANCOVA for the interaction effect of treatment, gender and numerical ability on students' achievement score $F_{(2,194)}$ $p>0.05$, $\eta 2=0.01$) was not significant after adjusting for pre-assessment attitude in Table 4.1.3.1. Thus, the null hypothesis is accepted. This implies that the interaction effects of treatment, gender and numerical ability have no significance onstudents' assessment-mode attitude in quantitative economics. The estimated marginal means for the post assessment attitude of treatment, gender and numerical ability are in Table 4.7.3**.**

Table 4.7.3: Estimated Marginal Means for Post Assessment Attitude scores of Treatment, Genders and Numerical Abilities

Groups	Gender of Respondents	Numerical Level	Mean	Std. Error	95% Confidence Interval	
					Lower Bound	Upper Bound
Declarative	Male	High ability	73.73	2.95	67.92	79.54
		Medium	82.25	4.55	73.28	91.23
		Low ability	79.87	2.43	75.08	84.66
	Female	High ability	81.00	2.61	75.84	86.15
		Medium	80.21	3.55	73.22	87.20
		Low ability	80.07	4.54	71.11	89.02
Enhanced-declarative	Male	High ability	84.34	3.70	77.04	91.64
		Medium	83.35	4.54	74.39	92.31
		Low ability	81.85	1.81	78.28	85.43
	Female	High ability	83.18	2.93	77.39	88.96
		Medium	87.24	3.43	80.47	94.00
		Low ability	82.18	2.38	77.48	86.88
Control	Male	High ability	82.14	12.78	56.92	107.35
		Medium	80.94	3.20	74.62	87.26
		Low ability	80.60	3.87	72.97	88.24
	Female	High ability	88.91	5.72	77.64	100.19
		Medium	78.11	2.30	73.57	82.65
		Low ability	79.87	2.43	75.08	84.66

ASSESS_ATT_PRETEST = 79.35.

Table 4.7.3 shows that high ability female students in control group had the highest adjusted mean score ($\bar{X}$ =88.91).This is followed by female students with medium ability level in enhanced-declarative group ($\bar{X}$ =87.24) while high ability male students had the least meanscore ($\bar{X}$ =73.73).

4.2 Discussion

4.2.1 There was no significant main effect of treatment (declarative and enhanced-declarative and conventional knowledge approaches) on students' (i) achievement, (ii) learning and (iii) assessment-mode attitudes in quantitative economics

The finding regarding the treatment's main effect indicated a significantmain effect of treatment (declarative, enhanced-declarative and conventional knowledge approaches) on students' success in quantitative Economics. This is inconsonant with Rittle-Johnson and Alibali's (1999) report that found a substantial main consequence of conceptual and knowledge of procedure on students' success in mathematics. In this study, the participants that were exposed to the enhanced-declarative knowledge approach were better than those that were exposed to the declarative knowledge approach. Thus, it could be explained that the enhanced-declarative knowledge approach proved more facilitative than the declarative approach as far as achievement in quantitative Economics is concerned. This finding is in line conclusion of Yilmaz and Yalçin (2012) which states that students with knowledge of procedures (enhanced-declarative approach) are more than their counterparts in the declarative knowledge group on laws of motion of Newton. Moreover, Johari *et al.* (2012) advised that students should master both knowledge approaches to enhance their understanding and skills in problem-solving tasks.

The possible explanation for the performance of students exposed to the enhanced-declarative knowledge approach is that relevant instances and case studies used in teaching unlocked the understanding of how principles and concepts of quantitative Economics were derived through the practical and experiential modes of teaching.

Considering the treatment's main effect on students' learning attitude in quantitative Economics, it was found that the major effect of treatment is not substantial on students' learning attitude. The learning attitude of participants did not change. The

finding of this study corroborates that of Apara and Yoloye (2014),that found the main consequence of treatment not significant on student's (learning) attitude to Chemistry, but fail to support the report of Nicolaidou and Philippou (2003) and Adodo and Gbore (2011) which affirms that learning attitudes are the best forecasters for approximation of learners' success. That attitude and performance in science (mathematics) are essentially related. The result of this study further reveals that exposure to new information or experience may not necessarily modify the attitude of some people, as claimed by Adesina and Akinbobola (2005).

Furthermore, the outcome of this study negates the reports of Adodo and Gbore (2011) that says that students' attitudes are prone to have a substantial effect on any agreeable explanation of levels of assessment displayed by learners in their school subjects. This means that treatments did not form the basis for change in students' learning attitude towards Economics. Moreover, the adjusted mean reveals that students' learning attitude in the control group seems significant when we compare it to the two experimental groups. This indicates that the increasing the effectiveness of treatment on students' learning was towards the control group.

Regarding the treatment's main effects on students' assessment-mode attitude, the finding indicated that the main effect of treatment (declarative and enhanced-declarative and conventional knowledge approaches) on students' assessment-mode attitude in quantitative Economics was not significant. The assessment-mode attitude of participants in the study did not change despite the application of treatment. This finding supported Abu-Dabat's (2014) report which declares that students' attitude towards the assessment framework has no effect on students' scores.Nevertheless,disagree with the submission of Dhindsa, Omar and Waldrip (2007) and Struyven, Dochy and Janssens (2005) that declare that assessment-mode attitude has a far-reaching consequence on learners' assessment performance. This means that irrespective of the assessment-mode format used in examining students, their attitude may likely not change (Mussawy, 2009).

4.2.2 There was no significant main effect of gender on students' (i) achievement, (ii) learning and (iii) assessment-mode attitudes in quantitative economics

The finding concerning the main effects of gender on students' achievement was statistically significant after adjusting for the covariates (pre-test score in

Economics). The result of this study upheld the report of Abubakar and Oguguo (2011), Akinsola and Odeyemi (2014), Adewale and Ekpo (2015), and Nnamani and Oyibe (2016) which stated that the gender's main effect was significant on students' achievement in Basic Science, Mathematics and Chemistry. Gisela (2011), David *et al.* (2013), and Rono and Rono (2016) likewise discoveredthat male and female students will more often than not perform distinctively in the different topic of education. Meanwhile, the adjusted mean score revealed that there was variation in students'attainment in quantitative Economics in line with the gender of participants. It was discovered that female participants attained greater than their male counterparts, affirming Nnamani and Oyibe (2016).

Nevertheless, it denounced the reports of Dania (2014), Adigun, Onihunwa, Irunokhai, Sada, and Adesina (2015), Eze, Ezenwafor and Obidile (2016), Olatoye and Aderogba (2011), Archibong (2014), Olasehinde and Olatoye (2014) and Ajai and Imoke (2015) that indicated a non-substantial effect of gender students' performance. Concerning the adjusted mean score, the finding of this report negates the conclusion of Choudhury and Das (2012), Bassey, Joshua and Asim (2004), Akinsola and Odeyemi (2014), Adigwe (2012), Casey *et al.* (2011), David *et al.* (2013), and Rono and Rono (2016) which give male students edge over female students.

The finding on the gender's primary effects on students' learning attitude revealed a non-significant. The result of this finding corroborates the findings of Olasehinde and Olatoye (2014) that the distinction among male and female students in science attainment and attitudinal variables is not significant. Also, Fatoba and Aladejana (2014) discovered that gender didn't influence students' attitudes, but there was a slight difference in their attitudes favouring females. Furthermore, the estimated marginal mean corroborates Rono and Rono (2016), and David *et al.* (2013) studies which reveal that male students pay further attention to their study than females. The result from the estimated marginal mean rejects the findings of Fatoba and Aladejana (2014), which reveals that the mean score in students' learning attitudes was attributable to female students. This implies that male students' learning attitude was quite positive than the female's perspective. Invariably, based on the estimated marginal mean, gender is a determinant factor in shaping a student's learning attitudes.

The finding on gender's main effect indicated that the core effect of gender on learners' assessment-mode attitude in quantitative Economics was not substantial. The

finding of this research shows that the null hypothesis should be upheld contrary to the findings of Alabi (2008), which says that there was a substantial gender disparityin students' assessment attitudes. Female students stood high above their male counterparts. In another study, Birenbaum and Feldman (1998) contradict the findings ofthis study which indicated gender effect was significant onstudents' attitudes towards multiple-choice examination format and open-finished examination type. However, the finding shows that male members will, in general, have moderately more helpful attitudes toward multiple-choice format than females. This study discloses the direction of the increasing effect of gender on students' assessment-mode attitude towards female students at the expense of male students. This implies that students' approach to studying is subject to their assessment's attitudes.

4.2.3 There was no significant main effect of numerical ability on students' (i) achievement, (ii) learning and (iii) assessment-mode attitudes in quantitative economics

The finding on the numerical ability's main effect was statistically significant on students' achievement after adjusting for the covariates (pre-test score in quantitative Economics). The finding of this research affirms the report of Akinsola and Odeyemi (2014) and Fatoke, Ogunlade and Ibidiran (2013), which revealed a significant numerical ability's main effect on students' performance in some subjects like Mathematics, Economics, Chemistry and Biology. This implies that students' performance in quantitative Economics is a function of their numerical abilities. The result further reveals that the high ability students had the maximum mean value followed by medium ability students. This finding further support Brian's (2016) findings that the numerical ability alone is enough to predict students' ability in Mathematics.

The finding on the numerical ability's main effect on students' learning attitude was not significant in quantitative Economics. The finding of this research shows further that high ability learners had the maximum mean value followed by medium numerical ability students. In line with the adjusted mean value,it can be said that the effect of numerical ability can influence students' learning attitude positively. In other words, high numerical ability can engender students' positive learning attitude.

The effectof numerical ability onstudents' assessment-mode attitude was not

statistically substantial after adjusting for the covariates (pre-assessment attitude in Economics). This study reveals that high ability students had the higher mean value followed by moderate ability students. Based on the adjusted mean value,it can be said that the main effect of numerical ability can influence students' assessment-mode attitude positively. In other words, high numerical ability can stimulate positive assessment-mode attitude of students.

4.2.4 There was no significant interaction effect of treatment (declarative, enhanced-declarative and conventional knowledge approaches) and gender on students' (i) achievement, (ii) learning and (iii) assessment-mode attitudes in quantitative economics

The interaction effect of treatment and gender on student's success in quantitative Economics was not significant. This corroborates the conclusion of Omotayo (2016) that the interaction effect of treatment and gender on student'sachievement in probability and sciences was not significant. However, it invalidates the finding of Mokobia and Okoye (2011) and Ayanwoye (2016), which concluded that a critical connection effect exists between treatment and gender among Mathematics students. The outcome of this study reveals that students of the enhanced-declarative group had the maximum adjusted mean score at both males and females. In contrast, declarative group students had the lowest adjusted mean score of female and male. This report discovered that female students performed better than their male colleagues in the three groups. Although there is no interaction effect of treatment and gender on students' attainment, it is evident that female participants are sound academically than male participants in the research. This observation was conform to the findings of Osakwe (1991) which submitted that female students are better in spatial conceptualisation than male students.

The finding on the interaction effect of treatment and gender on students' learning attitude was not statistically significant after adjusting to the covariates in quantitative Economics. This finding is also in tune with findings of Adeyemi (2014) and Akinbode (2014), who found no interaction effect of treatment and gender on students' learning attitude. The report of this study divulges that, in control group, male students had the maximum adjusted meanvalue, trailed by female and male students of the declarative and enhanced-declarative groups respectively. This report does not

agree with Fatoke and Olaoluwa (2014) which revealed that a substantial interaction effect exists between treatment and gender of Chemistry students' learning attitude and that male students exhibit a more encouraging attitude than female students after exposing them to a self-learning strategy.

The finding on the interaction effect of treatment and gender on students' assessment-mode attitude was not statistically substantial in quantitative Economics. The finding shows that participants of the enhanced-declarative group had the maximum adjusted mean marks of male and female. In contrast, students in the declarative group had the minor adjusted average. This indicates that the connection effect oftreatment and gender onstudents' assessment attitude is excellent in treatment group two with both male and females having the highest adjusted mean, while female students in the enhanced-declarative group surpass their male counterparts.

4.2.5 There was no significant interaction effect of treatment (declarative, enhanced-declarative and conventional knowledge approaches) and numerical ability on students' (i) achievement, (ii) learning and (iii) assessment-mode attitudes in quantitative economics

The interaction effect of treatment and numerical ability on students'performances in quantitative Economics was insignificant. This finding is in line with Bull's (2009) findings, which indicated a non-significant relationship between students' Mathematics anxiety levels and their math (numerical) test scores. The result is also in agreement with Falaye (2006) which attest to non-significance effectof treatment and numerical abilityon students' self-perception. This finding reveals that the interplay of treatment and numerical ability cannot justify high performance in quantitative content of Economics. This finding is contrary to Emeke and Adegoke (2001) that concluded that numerical ability has the power to impact on students' performance. It also contradict the opinion of Raymond, Raymond, and McCrickard (2008) that more effective teaching of mathematics in Economics will alleviate the fear.

The discovery on the interaction effects of treatment and mathematical ability on students' learning attitude was insignificant in quantitative Economics. This finding negates Mohd, Mahmood and Mohd (2011) and Fatoke and Olaoluwa (2014), which rejected the null hypothesis and reported that theinteraction effectof treatment and

mathematical ability was significant on the attitudes of students towards mathematics and Chemistry learning.

As regarding the interactioneffect of treatment andnumerical ability on students' assessment-mode attitude in quantitative Economics, the finding shows a non-significant interaction between treatment and numerical ability. This means that the relation of treatment and numerical ability cannot positively change students' assessment-mode attitude in Economics.

4.2.6 There was no significant interaction of gender and numerical ability onstudents' (i) achievement, (ii) learning and (iii) assessment-mode attitudes in quantitative economics

The interaction effects of gender and numerical ability on student's success in quantitative Economics was not significant. This is in accordance with the findings of Badru (2016), which affirms that the interaction effect of gender and numerical ability on students' success in mathematics is not significant. The outcome of the estimated mean score implies that female students with high ability level performed distinctly than other ability levels students. This negates Choudhury and Das (2012) reports that boys with numerical ability performed better in mathematics than girls. This finding further disagreed with Akinsola and Odeyemi (2014) that male students performed far better than female counterparts in quantitative economics.

The finding on the interaction effects of gender and numerical ability on students'learning attitude in quantitative economics is notsignificant. The estimated means score reveals that male students had the maximum mean score over females in numerical ability. This implies that male students' learning attitude were better towards numeric tests than female students.

The finding on the interaction effect of gender and numerical ability on students' assessment-mode attitude is not significant. Hence, the null hypothesis was not rejected. It is further revealed that high ability female students had the maximum adjusted mean score. This means that female students' assessment-mode attitude towards numeral is better than male students.

4.2.7 There was no significant interaction of treatment, gender and numerical ability on students' (i) achievement, (ii) learning and (iii) assessment-mode

attitudes in quantitative economics

The interaction effects of treatment, gender and numerical ability on student's achievements in quantitative Economics is not significant. This implies that the interaction of the three variables was not strong enough to improve students' performance in quantitative Economics. The estimated marginal mean scores reveals that high ability students across male and female had high mean scores.

The finding on the interaction effects of treatment, gender and numerical ability onstudents' learning attitude is not significant. The result of adjusted mean scores reveals that, in control group, male students had maximum mean values among high ability participants. This is supported by Choudhury and Das (2012) reports that boys have high achievement and positive attitude towards mathematics than girls. However, the interaction of the three variables is not viable enough to improve students' learning attitude towards quantitative Economics.

The finding reveals that the interaction effect of treatment, gender and numerical ability is not significant. The result of adjusted mean scores reveals that high ability female students in control group had maximum mean values. The combination of the independent and two moderator variables was not sufficient to stimulate students' assessment-mode attitude towards quantitative Economics.

CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter summarises the result in this study, implications, limitations, conclusion, advices for more studies, recommendations and contributions toknowledge.

5.1 Summary of findings

This study examined theeffects of declarative and enhanced-declarative knowledge approaches on learning outcomes of students in quantitative economics content in seniorsecondary schools in Oyo**.** The essence of the study was to establish the effect of two knowledge/teaching approaches onstudents' performance, learning attitude and assessment-mode attitude, and which of the approaches would be more viable.

The study employed a non-randomised pretest-posttest quasi-experimental design using a 3x3x2 factorial design. 219 SS 2 students from nine selected public secondary schools in Oyo town that comprises of Atiba, Oyo East and Oyo West local government areas partook in the study. Multistage sampling techniques were used for the study. Five research response instruments and three stimulus packages were used, and the data obtained were analysed with ANCOVA and descriptive statistics (mean and percentage). At 0.05 significance level, seven hypotheses were tested.

The summary of the main findings are as follows:

i. The treatment's main effect was statistically significant on students' achievement in quantitative Economics. Supplementary analyses reveal that the singular achievement in quantitative Economics was affected by the treatment after adjusting for the covariates ($F_{(2,194}$, $p<0.05$, $\eta 2 =0.17$) (Table 4.2.1.1). Participants that were exposed to the enhanced-declarative knowledge approach were better than those that were in the declarative knowledge approach. The treatment' main effect on students' learning and assessment-mode attitudes in quantitative Economics were not significant. The learning and assessment-mode attitudes of participants did

not change when we consider these teaching approaches. This means that treatment did not form the basis for change in students' learning and assessment-mode attitudes towards quantitative Economics.

ii. The gender's main effect onstudents' success in quantitative Economicswas statisticallysignificant. As revealed by the adjusted mean score, female participants performed better than their male counterparts. The gender's main effect on students' learning attitude in quantitative Economics was not significant. Although there was no substantial effect on gender on learners' learning, yet the result revealed that male students' learning attitude was relatively better than the female's attitude. The gender's main effect on students' assessment-mode attitude was not significant in quantitative Economics. Even though the assessment-mode attitude of students did not change, the increasing gender's effect on students' assessment-mode attitude could be traced towards the female.

iii. The finding on the numerical ability's main effects onstudents' success in quantitative Economics was statistically significant. It was discovered that students' achievement in quantitative Economics depends on their numerical abilities. The numerical ability's main effects on students' learning attitude were not significant in quantitative Economics. The numerical ability's main effect on students' assessment-mode attitude in quantitative Economics was not significant.

iv. The treatment and gender's interaction effects on student's success in quantitative Economics was not significant. Although the collaboration effect of treatment and gender on students' performance was not significant, yet it is evident that participants in the enhanced-declarative assembly performed better than other groups. The treatment and gender's interaction effects on students' learning attitude in quantitative Economics was not substantial. The treatment and gender's interaction effects on students' assessment-mode attitude in quantitative Economics was not significant. Further analysis revealed that the enhanced-declarative assembly that had the highest adjusted mean with female students outshined their male counterparts.

v. The treatment and numerical ability's interaction effects onstudent's achievement in quantitative Economics was not significant. This finding shows that the interplay of treatment and numerical ability cannot justify high performance in the quantitative content of Economics. The treatment and numerical ability's

interaction effects on student's learning attitude towards quantitative Economics was not significant. There was no interaction effect of treatment and numerical ability on scholar's assessment-mode attitude in quantitative Economics.

vi. The gender and numerical ability's interaction effects on students' achievement score in quantitative Economics was not significant. The gender and numerical ability's interaction effects on students' learning attitude was not significant in quantitative Economics. The gender and numerical ability's interaction effects on student's assessment-mode attitude in quantitative Economicswas not significant.

vii. The treatment, genderand numerical ability's interaction effect on performance of students in quantitative Economics were not significant. The combination of the three variables was not associated with students' performance in quantitative Economics. The treatment, gender and numerical ability's interaction effect on student's learning attitude in quantitative Economics was not statistically significant. The treatment, gender and numerical ability's interaction effect on student's assessment-mode attitude was not statistically significant in quantitative Economics.

5.2 Implications of the findings of the study

The findings of this research have numerous implication on stakeholders in secondary education. The following are the implication of the findings.

i. this result suggests that these knowledge approaches are better when relevant examples are used in the course of teaching and learning quantitative economics.

ii. The result suggests that enhanced-declarative knowledge approach is better when teaching takes an experiential format, which allow students to infer concepts of the topic on their own.

iii. It also suggest that declarative knowledge approach is far better than conventional approach when students are allowed to provide practical examples to support what their teachers have taught them.

iv. It reveals that the higher the numerical ability of students, the higher the performance in any mathematical subject, especially in quantitative economics.

v. The result implies that male students are more mathematically sound than female students, contrary to some researchers' findings.

vi. The result further suggests that thetwo-way and three-way interaction effects of treatment and gender, treatment and numerical ability, gender and numerical abilty and treatment, gender and numerical ability are not capable of influencing high and stable performance in quantitative economics among students in public secondary schools in Oyo town.

vii. The result reveals that whether one-way, two-way or even three-way effects of learning and assessment-mode attitudes on economics students cannot engender positive attitude towards quantitative economics.

5.3 Conclusion

The discoveries of this study have shown thatthe main effects oftreatment, gender and numericalability prove effective in effecting on students' academic achievement in quantitative economics. Further observation reveals that experimental group two- enhanced-declarative knowledge approaches havethe potency to increase and stabilise students' ability in quantitative Economics contents. Thus, applying the enhanced-declarative knowledge approach should be widely adopted for enhancing and stabilising the cognitive status of students in quantitative Economics. Although learners' learning attitude of the main effect was not significant, yet the male students obtained maximum performance ahead of female students. On the other hand, inspite of the non-significant main effect of students' assessment-mode attitude, female students proved more knowledgeable than male students in quantitative Economics.

Since variables of two-way and three-way analysis have no significant relationship in the study, the output unmasked that the interactive effects of each treatment do not depend on gender and numerical ability of participants in quantitative Economics. The findings of this study showed that a well-implemented knowledge approach could defuse both gender and numerical effects.

5.4 Limitations to the study

In this study, the following limitations are encountered:

i. The study was carried out in three local government areas in Oyo State. This makes the generalisation of the study's outcome difficult on the entire State or the nation.
ii. The sampled students did not all take part in the study. Some of the students deliberately absent themselves from the study, which has implications in the inferences made concerning the participants.
iii. Only SS 2 students located in Oyo town were examined in this study. Therefore, the conclusion of this study could not be generalised to the entire SS 2 students in the federation.
iv. Only students offering Economics were considered in this research. This study's conclusion cannot be generalised on students of other subjects.
v. Negative attitudes of students also serve as another barrier to the generalisation of the result of this study. If they had shown a positive attitude to quantitative Economics at the end of the lessons, more information about their feelings towards quantitative knowledge of Economics could have been collected and treated.
vi. Since the study was conducted in public secondary schools, the findings could not be generalised to private secondary schools within or outside the State.
vii. The study only covered some selected quantitative topics of Economics, and then there is a limitation of generalising the result to the entire quantitative Economics as a subject.
viii. The study also focused on quantitative economics, hence the findings could not be generalised to non-quantitative Economics.

5.5 Recommendations

These recommendations are made:

i. The research found that students would perform very well in quantitative Economics. Therefore, it is recommended that teachers should give priority to the use of examples, case studies and the likes during teaching and learning sessions.
ii. The research found that students that were taught with enhanced-declarative knowledge approachperformed far better thanother two groups. It is recommended that the teaching of quantitative Economics should adopt this

knowledge approach via the use of narrations, practical scenarios and other experiential methods for better understanding of topics under considerations.

iii. Writers of Economics textbooks should explore modules of the teaching enhanced-declarative knowledge approach, build on it and come up with texts that will promote internalisation of quantitative Economics.

iv. This study recommends that curriculum planners and designers should carve out quantitative economics from general economics to have full understanding of the mathematical economics.

5.6 Contributions to knowledge

Following the discoveries of the study, these knowledge contributions were added.

i. In this study, declarative and enhanced- declarative knowledge approaches modules for teaching quantitative economics were developed.

ii. This study also presented an effective knowledge approach which can promote quick knowledge attainment of quantitative aspect of Economics.

iii. The study has helped students learn complex competence through simple knowledge units and principles in quantitative Economics.

iv. This study has availed Economics teachers with systematic instructional procedures that would result in corresponding high cognitive achievement among Economics students of SS 2.

v. This study has further revealed a line of demarcation between the declarative and enhanced-declarative knowledge approaches.

vi. This study has provided teachers of Economics with valuable knowledge approaches for quantitative and non-quantitative Economics problems solutions, thereby improving their occupational competence.

vii. Lastly, the study has provided empirical facts on the comparative effects of declarative and enhanced-declarative knowledge approaches on students' achievement, learning and assessment attitudes in Economics in cognitive and affective domains. This study's findings could serve as a reason for subsequentstudy.

5.7 Suggestion for further studies

In accordance with the discoveries of thisstudy, the beneath submissions were made:

i. This study found that declarative and enhanced-declarative knowledge approaches substantially affectedstudents' performance in some selected quantitative Economics. Further investigation can be carried out in other quantitative and non-quantitative aspects of Economics.

ii. Further studies could be focused on other classes and subjects, especially at a lower level.

iii. This kind of study should be replicated in private secondary schools.

iv. A differential investigation of both public and non-public schools is suggested for further studies.

v. The study may perhaps be observed for a long-extended time. The programme could run for the entire session or more, with different topics on focus during the session(s).

REFERENCES

Abubakar, R.B. and Oguguo, O.D. 2011. Age and gender as indicators of scholasticachievement of school arithmetic and science students. Procedures of the 2011 International Conference on Teaching, Learning and Change. Recovered from http://hrmars.com/administrator/pics/186.pdf on third October 2019

Abu-Dabat, Z.I. 2014. The effect of students' mentalities towards the assessment framework on their outcomes in some scholastic subjects. Retrieved on 14 Dec. 2019 from https://www.zuj.edu.jo/wp-content/staff-research/art/dr.zakria/10.pdf

Adepoju, T.L. and Oluchukwu, E.E. 2011. An investigation of optional school students' scholastic execution at the senior school endorsement assessments and suggestions for instructive preparation and strategy in Nigeria. Worldwide Multidisciplinary Journal, Ethiopia 5(6):23, November 2011. Recovered Feb. 11, 2016, from http://www.ajol.info/index.php/afrrev/article/viewFile/72369/61293

Adesina, A.O. and Akinbobola, A.O. 2005. The demeanor of students towards low maintenance degree program of the workforce of schooling, Obafemi Awolowo University, Ile-Ife. Diary of Research of Education. 2(1):1-4.

Adeyemi, S.O. 2014. Effect of computer based test feedback on senior secondary school student's mathematics assessment outcomes. Unpublished M.ed project, University of Ibadan. Ibadan

Adeyemi, T.O. 2011. A near investigation of students' scholarly exhibition in broad daylight assessments in auxiliary schools in Ondo and Ekiti States, Nigeria. Momentum Research Journal of Economic Theory 3(2):36-42, 2011. Recovered Feb. 11, 2016 from http://maxwellsci.com/print/crjet/v3-36-42.pdf

Adewale, J.G. and Ekpo, O.J. 2015. Effects of two methods on student's achievement in junior secondary schools in Yakurr, Cross River State. *International Letters of Social and Humanistic Sciences.* 61:70-81 Retrieved on 15 February 2021 from DOI: 10.18052/www.scipress.com/ILSHS.61.70, SciPress Ltd., Switzerland

Adigun, J., Onihunwa, J., Irunokhai, E., Sada, Y., and Adesina O. 2015. Effect of gender on students' academic performance in computer studies in secondary schools in New Bussa, Borgu Local Government of Niger State. Diary of Education and Practice, 6:33. Recovered from https://pdfs.semanticscholar.org/47c5/d7d4b92f7414bf093f31a050be63df0e5142.pdf

Adigwe, J.C. 2012. Effects of numerical thinking abilities on students' performance in substance stoichiometry. Survey of Education Institute of Education Journal, University of Nigeria Nsukka. 23(1): 1-22. Recovered Feb. 12, 2016 from http://www.unn.edu.ng/distributions/documents/pictures/JCAdigwe.pdf

Adodo, S.O. andGbore L.O. 2012. Forecast of disposition and interest of science students of various capacities on their scholarly execution in fundamental science.Retrieved Oct. 10, 2015 from http://www.academicjournals.org/article/article1380968588_Adodo%20and%20Gbore.pdf

Adu, E. O. 2002. Two issue based evaluation methodologies, quantitative capacity and sex as determinants of students' scholarly achievement in Economics. Dept. of Teacher Education, University of Ibadan. xviii+210pp.

_____, Ojelabi, S.A. and Adeyanju, H. 2009. Quantitative capacity as associates of students' scholarly performance in auxiliary school Economics in Oyo State, Nigeria. An International Multi-Disciplinary Journal, Ethiopia. 3(2): 322-333, January, 2009. Recovered on August third, 2016 from http://afrrevjo.net/diaries/multidiscipline/Vol_3_no_2_art_25_Adu,%20Ojelabi%20and%20Adeyanju.pdf

Agboghoroma and Oyovwi 2015. Assessing effect of students' scholastic performance on recognized troublesome ideas in senior optional school Biology in Delta State. Diary of Education and Practice,6:30. Recovered on 20 February, 2017 from http://files.eric.ed.gov/fulltext/EJ1081378.pdf

Ajai, J.T and Imoko, B.I. 2015. Gender Difference Difference in Mathematics Achievement and Retention Scores: A contextual investigation of Problem-Based Assessment Method. *Journal of Research in Education and Science.* (IJRES), 1(1): 45-50.

Akinbode, O.O. 2014. Effectsof group simulation game strategy on the attitude and achievement of students in mathematics (algebra) in junior secondary school. Unpublished M.ed project, University of Ibadan. Ibadan.

Akinsola, M.K. and Odeyemi, E.O. 2014. Effects of mnemonic and prior knowledge instructional strategies on students' achievement in mathematics. *An International Journal of Education and Research*, 2(7) July 2014. Retrieved Feb. 12, 2016 from http://www.ijern.com/journal/July-2014/54.pdf

Alabi, O.F. 2008. Effects of two error correction strategies on senior secondary school students' assessment outcomes in English essay writing in Osun West, Nigeria. A PhD thesis, University of Ibadan, Nigeria

Ande, C.E. 2008. Essential Economics. Lagos, Tonad Publishers Limited.

Anderson, J. R. and Schunn, C.D. 2000. Implications of the ACT-R Assessment Theory: No Magic Bullets in R. Glaser (Ed.), *Advances in instructional psychology (5).* Mahwah, NJ: Erlbaum.

Apara, O.M and Yoloye T.Y. 2014. Effect of Problem-solving Approaches on Senior Secondary Students. West African Journal of Education. 34:11.

Archibong, A.U. 2014. Effect of three educational techniques, gender and mathematical capacity of students' exhibition in electrochemistry in Uyoneighborhood government space of AkwaIbom State. World Educators Forum, 5(1), November 2014

Aremu, A. 1999. Systems for working on the presentation of female students in mathematic. *African Journal of Education Research* 5(1): 77 – 85.

Arowolo, J.G. 2010. Use of two reasonable change methodologies in working on junior auxiliary school students' appraisal results in chosen coordinated science ideas in Kwara State. Unpublished PhD Thesis, University of Ibadan, Ibadan

Ayanwoye, O.K. 2016. Effects of Class Size and Gender on Students' Achievement in Science in Ogbomoso South Local Government Area of Oyo State, Nigeria. *International Journal of Education and Evaluation* ISSN 2489-0073 2(5) 2016 www.iiardpub.org

Badru, A.K. 2016. Issue Based Instructional Strategy and Numerical Ability as Determinants of Senior Secondary Achievement in Mathematics. *Journal of Education and Practice*,7(13). Retrieved on 15 February 2021 from Microsoft Word - JEP-Vol.7 No.13 2016 (core.ac.uk)

Becker, W.E., and Watts, M. 2001. "Showing Economics in the 21st Century: Still Chalk- what's more Talk."American Economic Review, 91:46-45

Bassey, S.W. Joshua, M.T. and Asim, A.E. 2004. Gender distinction and arithmeticperformance of provincial and senior auxiliary school students in Cross River State, Nigeria. Proceedings of epistemes, Cross River State, Nigeria.

Berge, T.T. and Hezewijk, R.V. 1999. Procedural and declarative knowledge: an evolutionary perspective. Theory and psychology. Sage Publication 9(5): 605–624
http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.467.8485andrep=rep1andtype=pdf

Bull, H. 2009. Identifying math anxiety in student nurses and focusing remedial work. Journal of Further and Higher Education, 33, 71–81.

Canobi, K. H. 2009. Idea method connections in kids' expansion and deduction. *Journal of Experimental Child Psychology*, 102: 131-149.

Casey, B.M., Dearing, E., Vasilyeva, M., Ganley, C.M. and Tine, M. 2011. Spatial and mathematical indicators of estimation execution: the directing effects of local area pay and sex. *Journal of Educational Psychology* 2011, 103(2): 296–311 Retrieved on 12 February 2016 from http://www.dartmouth.edu/~edpsychlab/PUBLICATIONS_files/Casey,%20Dearing,%20Vasilyeva,%20Ganley,%20and%20Tine%202011.pdf

Choudhury, R. and Das, D.K. 2012. Effect of demeanor towards math and study propensity on the achievement in arithmetic at the optional stage.*International Journal of Engineering Research and Applications (IJERA)*. 2(6). November-December 2012, pp.192-196. Retrieved on 3rd August, 2016 from http://www.ijera.com/papers/Vol2_issue6/AE26192196.pdf

Dania P.O. 2014. Effect of Gender on Students Academic Achievement in Secondary School Social Studies. *Journal of Education and Practice*. http://www.iiste.org (Online) 5(21).

David, O. E., Okorn, O., Koko, E., and Bessong, F. 2013. Attitudes of science students towards science teaching in Cross River State, Nigeria. *Journal of Education and Practice*. 4(5): 131-134.

Demircioglu, H. and Norman, N. 1999. Effects of certain factors on science achievements and science related perspectives of secondary school students.*HacettepeÜniversitesiEğitimFakültesiDergisi*

Dhindsa, H., Omar, K. and Waldrip, B. 2007. Upper auxiliary Bruneian science students' view of appraisal. *International Journal of Science Education, 29*(10): 1281-1280.

Drucker J. 1994. Cognitive Theory, London: Longman Publications.

Dursun, S. 2015. Examination of secondary school students' disposition and tension levels towards Science as far as certain factors. An Educational Research and Reviews10(13): 1773-1780. Retrieved on 31 July, 2016 from http://www.academicjournals.org/journal/ERR/article-full-text-pdf/E54BCDE53983

Emeke, E.A. and Adegoke, 2001.The interaction effect for test response mode, students' numerical ability and gender on cognitive achievement in senior secondary school Physics in Y. Awosika et al. Education Tropical Issue in Education. Papers in honour of Prof. C. O. Udoh

Eze, T. I. Ezenwafor J. I. and Obidile, J. I. 2016. Effect of gender on students' academic execution and retention in financial accounting in technical colleges. *British Journal of Education, Society & Behavioural Science*. 18(4):1-9. Article no.BJESBS.29583 ISSN: 2278-099. http://www.journalrepository.org/media/journals/BJESBS_21/2016/Nov/Eze1842016BJESBS29583_1.pdf

Fatoba, J.O. and Aladejana, A.L. 2014. Effects of gender on students' disposition to material science in auxiliary schools in Oyo State, Nigeria. *European Scientific Journal*. March 2014 edition. 10(7)Retrieved Sept. 11, 2015 from http://eujournal.org/files/journals/1/articles/2991/submission/review/2991-8608-1-rv.pdf

Falaye, F.V. 2016. Numerical ability, Course of study differences in students' achievement in Practical geometry. ERIC. EJ75109.

Fatoke, A.O., Ogunlade, T.O. and Ibidiran, V.O. 2013. The effects of critical thinking educational technique and mathematical capacity on students' appraisal results. *International Journal of Engineering and Science (IJES)* 2(2): 97-102. Retrieved Feb. 12, 2016 from http://www.theijes.com/papers/v2-i10/Part.3/P021030970102.pdf

Fatoke, A.O and Olaoluwa, O.O. 2014. The effects of critical thinking educational technique and mathematical capacity on students' appraisal results. *IOSR Journal of Research and Method in Education*, 4(5): 50-53. Retrieved on Jan. 8, 2015 from http://www.iosrjournals.org/iosr-jrme/papers/Vol-4%20Issue-5/Version-2/F04525053.pdf

Festus, C. and Ekpete, O.A. 2012. Working on students' presentation and demeanor towards science through issue based-tackling strategies (PBST). Retrieved Jan. 8, 2015 from http://www.hrmars.com/admin/pics/608.pdf

Fry, H., Ketteridge, S. and Marshall, S. 2009. Understanding student assessment in a handbook for teaching and assessment in higher education: enhancing academic practice. Edited by Fry, H., Ketteridge, S. and Marshall, S. 3rd Edition, Routledge 270 Madison Ave, New York, NY 10016. Retrieved Aug. 28, 2015 from http://biblioteca.ucv.cl/site/colecciones/manuales_u/A%20Handbook%20for%20Teaching%20and%20Assessment%20in%20Higher%20Education%20Enhancing%20academic%20and%20Practice.pdf

Gagne, R. and Driscoll, M. 1988. Essentials of Assessment for Instruction (2nd Ed.). Englewood Cliffs, NJ: Prentice-Hall.

Gegbe, S.S. and Sheriff, V.K. 2015. Factors adding to students' horrible showing in arithmetic at West African Senior School Certification Examination (A Case Study: Kenema City, Eastern Province Sierra Leone). *International Journal of Engineering Research and General Science* 3(2), 2015 Retrieved Feb. 11, 2016 from http://pnrsolution.org/Datacenter/Vol3/Issue2/147.pdf

George, R. 2000. Estimating change in students' mentalities toward science over the long run: An use of inactive variable development displaying. *Journal of Science Education and Technology*. 9(3): 213–215.

Gongden, J.J., Gongden, E.J. and Lohdip, Y.N. 2011. Evaluation of the troublesome spaces of the senior auxiliary school 2 (two) science schedule of the Nigeria science educational program.on 20 February, 2017 from http://www.ajol.info/index.php/ajce/article/view/82525/72681

Guglielmino, L. M. 2008. Why self-coordinated evaluation? *International Journal of Self-Directed Assessment*, 5(1): 1-14.

Haapasalo, L. 2012. Two educational methodologies connecting calculated and procedural information. Retrieved in Sept. 3, 2015 from http://cerme8.metu.edu.tr/wgpapers/WG16/WG16_Haapasalo.pdf

Harris, J. 2012. Strategies for Declarative Knowledge Assessment. Retrieved April 12, 2016 from http://edtech2.boisestate.edu/jenniferharris2/503/Types%20of%20Assessment%20Reflection%20Paper%20-%20503.pdf

Hernando, M., Guzman, E. and Conejo, R., 2014. Estimating procedural information in critical thinking conditions with thing reaction hypothesis.Retrieved Sept. 11, 2015 from http://riuma.uma.es/xmlui/bitstream/handle/10630/5646/final_paper_riuma.pdf?sequence=1

Ibeh, G.F, Onah D.U, Umahi A.E, Ugwuonah F.C, Nnachi N.O and Ekpe J.E. 2013. Procedures to further develop demeanor of optional school students towards material science for maintainable innovative improvement in Abakaliki L.G.A, Ebonyi-Nigeria. Retrieved Sept. 11, 2015 from http://www.google.com.ng/url?q=http://infinitypress.info/index.php/jsds/article/download/132/123andsa=Uandved=0CE8QFjAMOApqFQoTCMnknMWAt8gCFYa2FAodsm8ONwandsig2=munPh-ZTJFsG5pzMtPH7Lwandusg=AFQjCNH6-oyjkxuDq_GHFAc5I-nqjOw5EQ

Johari, S., Nor H. I. and Mahani M. 2012. Applied and procedural information in issue tackling. Retrieved on 8 June, 2016 from http://tree.utm.my/wp-content/uploads/2013/03/1569582727.pdf

Joseph, G. 2013. A review on school factors affecting students' mentality towards learning arithmetic in the Community Secondary Schools in Tanzania: The instance of Bukoba Municipal Council in Kagera Region. (Masters dissertation). Retrieved from http://repository.out.ac.tz/919/

Khadjooi, K., Rostami, K. and Ishaq, S. 2011. How to use Gagne's model of Instructional design in teaching psychomotor skills. Retrieved 20 March, 2023 from gastroenterol hepatol bed bench, vol 4.3, pages 116-119

Kidane, T.T. and Worth, S.H. 2013. Demeanor of students in the formal instructive area towards agrarian instruction and preparing in South Africa. Retrieved Oct. 10, 2015 from http://www.krepublishers.com/02-Journals/JHE/JHE-44-0-000-13-Web/JHE-44-1-000-13-Abst-PDF/JHE-44-1-053-13-2452-Kidane-T-T/JHE-44-1-053-13-2452-Kidane-T-T-Tx%5B7%5D.pmd.pdf

Kirschner, P. and van Merrienboer, J.J.G 2009. Ten stages to complex appraisal a new way to deal with guidance and informative plan. Retrieved 19 September, 2016 from(PDF) Ten Steps to Complex Learning: a Systematic Approach to Four-Component Instructional Design (3rd ed.), by Jeroen J. G. van Merriënboer and Paul A. Kirschner (researchgate.net)

Kurt, S. 2020. Robert Gagne's taxonomy of learning. Retrieve 20 March, 2023 from https://educationaltechnology.net/robert-gagne's-taxonomy-of-learning/#:~.text=Gagne%20classified%20learning%20outcomes%20into,strategies%2C%20motor%20skills%20and%20attitudes.

Lanzer, P. and Taatgen, N. 2013. Procedural information in percutaneous coronary intercessions, J. ClinExpCardolog S6:005, doi:10,4172/2155-9880, S6-005

Lauritzen, P. 2012. Calculated and procedural knowledge of mathematical functions. Distributions of the University of Eastern Finland, Dissertations in Education, Humanities, and Theology 34. Retrieved on 8 June, 2016 from http://epublications.uef.fi/pub/urn_isbn_978-952-61-0893-3/urn_isbn_978-952-61-0893-3.pdf

Lojová, G. 2009. The job of decisive and procedural information in instructing unfamiliar language sentence structure.Retrieved on February 15, 2017 from http://www.rusnauka.com/10_NPE_2009/Philologia/43897.doc.htm

Mensah, J. K., Okyere, M., and Kuranchie, A. 2013. Student attitude towards Mathematics and performance: Does the teacher attitude matter? Journal of Education and Practice, 4(3), 132-139.

Mikre, F. 2010. The jobs of evaluation in educational program practice and improvement of evaluation. *The Ethiopian Journal of Education and Sciences*. 5(2).http://www.ajol.info/index.php/ejesc/article/viewFile/65376/53069

Miron, M. 2014. Students' perspectives towards methods of assessment. Retrieved on 14 Dec.2019 from https://www.iutconference.com/wp-content/uploads/2014/03/Miron_Paper_IUT2010.pdf

Mohd, N., Mahmood, T., and Mohd N. I. 2011. Factors that Influence Students in Math Achievement.*International Journal of Academic Research*.3(3).

Mokobia, M. O and Okoye, N. S. 2011. Effect of class size on the teaching and learning of chemistry in secondary schools in Delta State, Nigeria. *Journal of Education and Policy Review, 3. Cenresin Publications, www.cenresinpub.org*

Mokoro, J.M., Wambiya, P. and Aloka P.J.O. 2014. Effect of chosen social elements on students' demeanor towards science. Retrieved Oct. 10,2015 from http://www.mcser.org/journal/index.php/mjss/article/viewFile/3917/3833

Mutai, K. J. 2011. Perspectives towards learning and execution in arithmetic among students in chosen auxiliary schools in Bureti area, Kenya (Masters Dissertation). Retrieved from http://irlibrary.ku.ac.ke/bitstream/handle/123456789/609/JACKSON%20KIPRONOH.pdf

Mussawy, S.A.J. 2009. Evaluation Practices: Student's and instructors' view of homeroom appraisal. An unpublished master's thesis of Department of

Education, Policy, Research, and Administration (EPRA) School of Education, University of Massachusetts. Retrieved 29 July, 2016 from http://scholarworks.umass.edu/cgi/viewcontent.cgi?article=1008andcontext=cie_capstones

Nicolaidou, M., and Philippou, G. 2003. Perspectives towards math, self-viability and achievement in critical thinking. European Research in Mathematics Education III. Pisa: University of Pisa, 1-11. Retrieved from http://www.dm.unipi.it/~didattica/CERME3/proceedings/Groups/TG2/TG2_nicolaidou_ cerme3.pdf

Nnamani S.C and Oyibe O.A. 2016. Gender and Academic Achievement of Secondary School Students in Social Studies in Ebonyi State. *British Journal of Education* 4(8):72-83, August 2016

Ogbeide, I.J. 2013. Effect of gender, school area and students' mentality on scholastic achievement in essential innovation in Delta State. An unpublished Doctoral thesis, University of Nigeria, Nsukka. Retrieved on 31 July, 2016 from http://repository.unn.edu.ng:8080/jspui/bitstream/123456789/1747/1/IDIALU%20JONATHAN%20OGBEIDE.pdf

Ogunkola, B.J. and Samuel, D. 2011. Science teachers' and students' perceived difficult points in the integrated science curriculum of lower secondary schools in Barbados. *World Journal of Education*, 1(2) Retrieved on 20 February, 2017 from http://www.elainegalvin.ie/wp-content/uploads/2014/09/world-journal-of-education.pdf

Okwilagwe, E.A. 2011. Assessment of geography teachers' utilisation of evaluation instruments in grading students. *West African Journal of Education Research* 31:1-9.

_____. and Oyedepo, J.A. 2007. Teachers' perception of the quantitative aspects of senior secondary school economics syllabus. *West African Journal of Education.* 26:112-123.

_____. and Samuel, E.O. 2011. Evaluation of social studies teachers' effectiveness in selected Junior Secondary Schools in Oyo State. *African Journal of Educational Research* 15:1-12.

Olasehinde, K.J. and Olatoye, R.A. 2014. Correlation of male and female senior auxiliary School students' appraisal results in science in Katsina State, Nigeria.*A Mediterranean Journal of Social Sciences*, 5(2):517-523, January 2014. Retrieved Feb. 12, 2016 from http://www.mcser.org/journal/index.php/mjss/article/viewFile/2015/2014

Olatoye, R.A and Aderogba, A.A. 2011. Performance of senior secondary school science students in aptitude test: the role of student verbal and numerical abilities. *Journal of Emerging Trends in Educational Research and Policy Studies* (JETERAPS) 2 (6): 431-435. Retrieved on 31 July, 2016 from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.301.8396andrep=re

p1andtype=pdf

Olorundare, A.S. 2011.Corresponds of helpless scholarly execution of auxiliary school students in the sciences in Nigeria. A Paper presented at the Virgina State University, Petersburg, Virgina, USA (June 2011). Retrieved on 11 February, 2016 from https://www.unilorin.edu.ng/publications/asolorundare/correlates%20of%20poor%20academic%20performance%20of%20sec.%20sch.%20students%20i%20%28NXPowerLite%29.pdf

Olzmann, A.E. 2012. Critical thinking and memory: examining the feasibility and memorability of remote partner's concerns. Retrieved on 31 July, 2016 from https://deepblue.lib.umich.edu/bitstream/handle/2027.42/91798/aolzmann.pdf?sequence=1

Omotayo S.A 2016. Effects of dynamic geometry software and 5e assessment cycle on student's achievement, interest and retention in senior secondary school geometry in Ibadan. Unpublished Ph.D Project, University of Ibadan.

Oosterhof, A.2012. Sorts of Changes that happen as definitive information increments. Center for Advancement of Assessment and Assessment (CALA). Retrieved on 21 October, 2016 from http://www.cala.fsu.edu/files/declarative_knowledge.pdf

Osakwe, E. O. 1991. Effects of informative modes on students' spatial conceptualization in social investigations. (An Unpublished Ph.D Thesis). University of Ibadan, Ibadan.

Oyediji, A.O. 2014. Effects of self-directed assessment and collaborative task methods on junior secondary school students' assessment outcomes in social studies in Oyo State. An unpublished doctoral thesis of the Institute of Education, University of Ibadan, Ibadan, Nigeria.

Raymond, F., Raymond, A. and McCrickard, M. 2008."Stuck behind the math: just how helpful can one expect technology to be in the economics classroom? *International Review of Economics Education*, 7(1): 62-102.

Reynolds, R.L 2005. Alternative microeconomics – Part 1, Chapter 1 – Nature of Economics. Retrieved Jan. 22, 2016 from https://cobe.boisestate.edu/lreynol/WEB/PDF/Short_1_Introduction.pdf

Rittle-Johnson, B., and Alibali, M.W., 1999. Reasonable and procedural information on science: Does one prompt the other? *Journal of Educational Psychology* 1999, 91(1): 175-189 Retrieved Oct. 10, 2015 from http://peabody.vanderbilt.edu/research/pro/about_peabody_research/funded_projects/career_project_home/ATME_Rittle-JohnsonandAlibali_1999.pdf

_____. and Koedinger, K. R. 2009. Emphasizing between illustrations ideas and methods can further develop science information.*British Journal of*

Educational Psychology, 79: 483–500. doi:10.1348/ 000709908X398106.

_____.and Schneider, M. 2012. Creating theoretical and procedural information on science. Retrieved Oct. 10, 2015 from https://www.uni-trier.de/fileadmin/fb1/prof/PSY/PAE/Team/Schneider/RittleJohnsonSchneiderInPress.pdf

_____., Siegler, R. S., and Alibali, M. W. 2001. Creating applied understanding and procedural ability in arithmetic: An iterative process. *Journal of Educational Psychology, 93*: 346-362.

Rono, D. and Rono, O.C. 2016. An appraisal of the perspectives of students towards history also government in chose auxiliary schools in Bomet County in Kenya.*Journal of Education and Practice*. Retrieved from https://files.eric.ed.gov/fulltext/EJ1109205.pdf

Sakariyau, A.O., Taiwo, M.O. and Ajagbe, O.W. 2016. An Investigation on secondary school students' attitude towards science in Ogun State, Nigeria. *Journal of Education and Practice*,7(28). Retrieved from https://files.eric.ed.gov/fulltext/EJ1118531.pdf

Sarmah, A., and Puri, P. 2014. Demeanor towards mathematics of the students studying in recognition engineering institute (Polytechnic) of Sikkim.*Journal of Research & Method in Education*, 4(6). Retrieved from http://www.academia.edu/download/36434404/B04630610.pdf

Schneider, M., and Stern, E. 2009. The Inverse Relation of Addition and Subtraction: A Knowledge Integration Perspective. *Mathematical Thinking and Assessment, 11*: 92-101.

Struyven, K., Dochy, F., and Janssens, S. 2005. Students' perceptions about evaluation and appraisal in higher education: A Review. *Assessment and Evaluation in HigherEducation, 30*(4):325-341. Retrieved on 30 July, 2016 from https://perswww.kuleuven.be/~u0015308/Publications/Proof%20CAEH300401.pdf

Syyeda, F. 2016. understanding attitudes towards mathematics (ATM) utilizing a Multimodal modular Model: An Exploratory Case Study with Secondary School Children in England.*Cambridge Open-Review Educational Research e-Journal*, 3:32-62. Retrieved from http://corerj.soc.srcf.net/?page_id=224

Terregrossa, R.A., Englander, F and Wang, Z. 2009. Why assessment styles matter for student achievement in college Economics. Journal for Economic Educators, 9(1), Summer 2009 Pg 16-31 http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.534.4210andrep=rep1andtype=pdf

The West African Examinations Council 2014. Regulations and Syllabuses for the

West African Senior Secondary Certificate Examination (WASSCE), the WAEC, Yaba, Lagos

Thien, R. 2009. 'Chalk and talk showing technique sufficiently not' The Bruney Times http://www.bt.com.bn/home_news/2009/04/25/chalk_and_talk_teaching_method_not_enough

Ton, K.A. 2003. Gender and practical Task. Science educational Research 35: 225 – 265

Turns, S.R. and Meter, P.N.V. 2011. Applying information from instructive brain science and intellectual science to a first course in thermodynamics.A material of the American Society for Engineering Education.

Vermunt J. 2013 Patterns in student assessment at university. Retrieved Jan. 22, 2016 from http://www.su.se/polopoly_fs/1.127246.1362661019!/menu/standard/file/Keynote%20Jan%20Vermunt%2015feb2013%20Stockholm.pdf

Wiliam, D. 2013. Appraisal: the scaffold among educating and evaluation.*Voices from the Middle*. 21(2). Retrieved Jan. 22, 2016 from http://www.ncte.org/library/NCTEFiles/Resources/Journals/VM/0212-dec2013/VM0212Assessment.pdf

Yılmaz, Ç., Altun, S. A., and Olkun, S. 2010. Factors influencing students' disposition towards Math:: ABC theory and its reflection on practice. Procedia-Social and Behavioral Sciences, 2(2): 4502-4506. Retrieved from https://www.sciencedirect.com/science/article/pii/S1877042810007603

Yilmaz, I., and Yalçin, N., 2012. The relationship of procedural and declarative knowledge of science teacher candidates in Newton's laws of motion to understanding.*American International Journal of Contemporary Research. 2(3); March 2012*

APPENDIX I

THE INTERNATIONAL CENTRE FOR EDUCATIONAL EVALUATION (ICEE)
INSTITUTE OF EDUCATION,
UNIVERSITY OF IBADAN, IBADAN, NIGERIA

ECONOMICS STUDENTS' LEARNING ATTITUDE SCALE (ESLAS)

Dear Students,

This survey is intended to inspire data from S.S. 2 students in their mentality towards the appraisal of Economics. The data inspired will be used mainly for research purposes and will be treated in strict confidence.

You are therefore mentioned to react to the questionnaire as objectively as possible.

INSTRUCTION:

Please tick(√) in the box the most appropriate that represents your view. Use the scale and record your reaction in the space given to one side of eachquestion.

SECTION A

Name of School:_____

Sex: Male( ) Female( )

Age: Below 15( ), 15-18( ), 19-21( ), 21and above( )

Class: S.S. 1( ), S.S. 2( ), S.S. 3( )

SECTION B

INSTRUCTION: Kindly tick(√) in the case that best addresses your perspective.
SA= Strongly Agree **A**=Agree **D**=Disagree **SD**=Strongly Disagree

S/N	LEARNING ATTITUDE STATEMENTS	SA	A	D	SD
Cognitive					
1	I can learn Economics with ease.				
2	I understand Economics calculations				
3	I find it difficult to understand Economics concepts				
4	How I think sometimes affect my understanding of Economics.				

Affection for Learning Economics		**SA**	**A**	**D**	**SD**
5	I like Economics				
6	I feel insecure when I have to solve Economics problems				
7	I am afraid of attending Economics classes				
8	I enjoy taking Economics lessons				
The value attached to Learning Economics		**SA**	**A**	**D**	**SD**
9	I use Economic knowledge in my everyday life				
10	I will not need Economics in my proposed chosen career				
11	Economics is irrelevant in my life				
12	Acquiring Economics skills will make me more employable.				
13	Economic thinking isn't appropriate in my life outside my work				
14	Economics ought to be a necessary piece of my expert preparing				
Effort put in Learning Economics		**SA**	**A**	**D**	**SD**
15	I plan to put in more effort to my Economics course.				
16	I intend to finish the entirety of my Economics assignments				
17	I plan to spend extra time on this subject				
18	The more I learn Economics, the more I understand the Economics concepts				
Interest in Learning Economics		**SA**	**A**	**D**	**SD**
19	I am keen on having the option to convey Economics data to other people.				
20	I am interested on utilizing Economics concepts to understand the world around me.				
21	I am interested in assessment Economics				
22	I am happier while assessment Economics than other subjects				
23	I enjoy assessment new topics in Economics				
Difficulty in Learning Economics		**SA**	**A**	**D**	**SD**
24	A great many people need to learn better approaches for deduction to do Economics				
25	Assessment Economics requires a lot of skills and discipline				
26	Economics is a subject immediately educated by a great many people				
27	Economics is a complicated subject				
28	Forgetting what I learn in Economics in a short time makes me anxious				
29	I experience difficulties while assessment Economics				

APPENDIX II
THE INTERNATIONAL CENTRE FOR EDUCATIONAL EVALUATION (ICEE)
INSTITUTE OF EDUCATION,
UNIVERSITY OF IBADAN, IBADAN, NIGERIA

ECONOMICS STUDENTS' ASSESSMENT ATTITUDE SCALE (ESAAS)

Dear Students,

This survey is intended to inspire data from S.S. 2 students in their mentality towards the appraisal of Economics. The data inspired will be used mainly for research purposes and will be treated in strict confidence.

You are therefore mentioned to react to the questionnaire as objectively as possible.

INSTRUCTION:

Please tick(√) in the box the most appropriate that represents your view. Use the scale and record your reaction in the space given to one side of eachquestion.

SECTION A

Name of School:_____

Sex: Male( ) Female( )

Age: Below 15( ), 15-18( ), 19-21( ), 21and above( )

Class: S.S. 1( ), S.S. 2( ), S.S. 3( )

SECTION B

INSTRUCTION: Kindly tick(√) in the case that best addresses your perspective.
SA= Strongly Agree **A**=Agree **D**=Disagree **SD**=Strongly Disagree

S/N	ASSESSMENT ATTITUDESTATEMENTS	SD	D	A	SA
Congruence with Planned Assessment					
1	My Economics session tests assess what I memorise				
2	My Economics session tests assess what I have learnt				
3	My home tasks are concerning what I have done in class				
4	How I am tested resembles what I did in class				
5	I'm assessed on what the teacher has taught me				
6	I'm assessed on what my teacher has not taught me in the class				

Authenticity		**SD**	**D**	**A**	**SA**
7	My Economics assessment assignments are helpful for regular day to day existence				
8.	I discover Economics appraisal assignments applicable to what I do outside of school.				
9.	Assessment in Economics class tests my capacity to apply what I know to real issues				
10.	I can show others what I have been taught in Economics.				
Transparency		**SD**	**D**	**A**	**SA**
11	I get what is required in all Economics class appraisal errands				
12	I am advised early when I am to be evaluated.				
13	I'm told ahead of time on what I am to be evaluated in.				
14	I'm clear concerning what my educator needs in my appraisal errands.				
15	I realize how a specific evaluation assignments will be stamped.				
Assessment modes		**SD**	**D**	**A**	**SA**
16	My educator discloses to me how every method of evaluation is to be utilized				
17	I prefer being assessed with objective questions				
18	I have no fear in writing objective tests.				
19	The use of objective testing helps me to have the knowledge of Economics concepts.				
20	I find it easy to pass when I am assessed with objective items				
21	I hate essay test				
22	Essay items are difficult to pass				
23	I don’t feel at ease when I am assessed with essay items				
24	I am always anxious when I am informed that I will be assessed with essay items.				
25	I prefer being assessed with essay questions.				
26	The use of essay testing helps me to have skills required in the assessment of Economics.				
27	I find it difficult to answer questions that are in fill-in-the gap format				
28	I have not been given questions with matching in the class.				
29	The use of matching will help me to understand concepts and procedure in Economics assessment.				
30	Home assignments are usually used in the teaching and assessment of Economics in my school.				
31	The use of home assignment will help me to understand further the teaching of Economics.				

APPENDIX III

THE INTERNATIONAL CENTRE FOR EDUCATIONAL EVALUATION (ICEE)
INSTITUTE OF EDUCATION,
UNIVERSITY OF IBADAN, IBADAN, NIGERIA

ECONOMICS DIAGNOSTIC TEST (EDT)

Thistest will aim at assessing the understanding level of students. Please, relax and be at your best. The result of this exercise will be used for research purposes only.

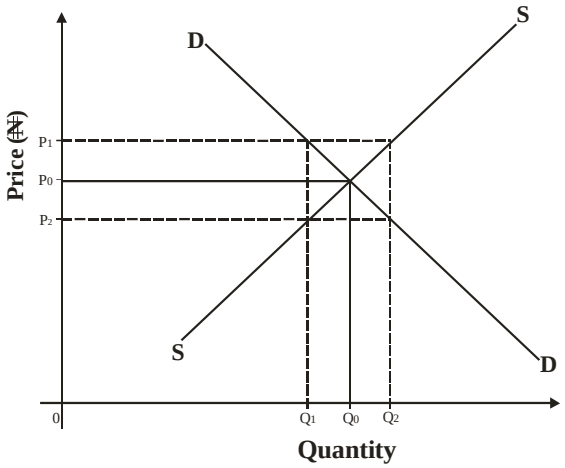
INSTRUCTION

You are to endeavor every one of the inquiries by picking the most appropriate choice from the list. Each question is trailed by four alternatives letter (a) to (d). Discover the right alternative for each question and circle the letter that represents your response to eachquestion. Circleonly one option to eachquestion.

You have 45 minutes to attempt the questions.

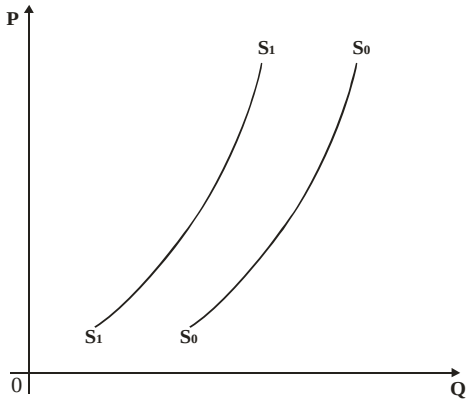
1. Mr. Bala's income is ₦800.00 per month while that of Mr Jatau is ₦1,200. If Messrs Bala and Jatau pay ₦80.00 and ₦120.00 individually as charges, the expense framework is (a) moderate (b) regressive (c) proportional (d) ad valorem.
2. Effective demand in Economics means (a) the desire for a commodity (b) a proposal to purchase a good on credit (c) the desire for a commodity or service backed by purchasing power (d) an irrevocable instruction to the seller to meet up the needs of the buyers.
3. The law of demand states that (a) as cost expands, amount requested remaining parts consistent (b) request increments as cost builds (c) as cost falls, amount requested likewise falls (d) as cost falls, theamount demanded increments.

Utilize the graph beneath to address questions 4 and 5

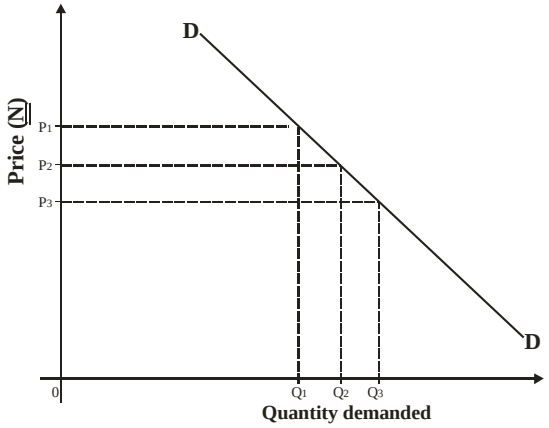


4. In the chart over, the balance amount is (a) 0Q1 (b) 0Q0 (c) P0Q0 (d) P1P0
5. At cost 0P2 (a) request surpasses supply (b) supply surpasses request (c) request rises to supply (d) nothing unless there are other options.
6. Disposable pay is all out to pay (a) less expense (b) isolated by charge (c) in addition to burden (d) increased by charge
7. Government income will increment in case charge is forced on a decent whose request is (a) flexible (b) inelastic (c) unitary versatile (d) completely versatile
8. In the normal market situation, at the point when the cost of a commodity rises, the (a) demand for the commodity will rise (b) demand for the commodity will be constant (c) supply of the commodity will be constant (d) supply of the commodity will rise.
9. Goods for which request ascends as pay rises are (a) reciprocal products (b) substandard merchandise (c) ordinary products (d) substitutes.
10. The development along a similar interest bend is (a) adjustment of interest, (b) change in amount requested, (c) change sought after (d) market demand.
11. A duty is supposed to be acceptable when (a) it yields more income to the state to the detriment of individuals' capacity to pay (b) the expense of gathering it is equivalent to the income it produces (c) it is forced out of nowhere to the point that nobody can evade its instalment (d) its instalment makes least bother the citizen.
12. An expansion in the interest for spread diminishes the interest for margarine; this sort of request is branded as (a) cutthroat interest (b) versatile reward(c) inferred request (d) composite interest.
13. Which of the accompanying blend of characteristics guarantees a decent expense framework? (a) Deflationary, value, conviction and comfort (b) Economy, accommodation, assurance and value (c) Economy, deflationary, inflationary and sureness (d) Economy, accommodation, conviction and inflationary.

14. The demand for an item not straightforwardly for sure-fire utilization yet for the creation of another product is (a) serious interest (b) determined interest (c) composite interest (d) joint interest



15. In the above diagram, S_0S_0 is the first stockpile bend, while S1S1 is the new bend. Which of the going with does S1S1 address? (a) Movement along a given stock bend (b) an improvement in stream (c) a reduction in supply (d) An entirely versatile inventory.
16. The frequency of an expansion in charge on a product with entirely inelastic interest will be on the (a) distributer, (b) retailer, (c) Government, (d) shopper
17. A change in the sum mentioned of a given product is directed by the (a) size of the general populace (b) pay of the customer, (c) cost of the thing (d) taste and style.
18. If the value falls underneath the harmony, (a) request will approach supply (b) request will be more noteworthy than supply (c) supply will be more prominent than request (d) cost will become vague.
19. Which of the accompanying will have a seriously weakening effect on the economy? (a) an assessment on the costs of vehicles (b) an expense on petroleum (c) an abatement in the stockpile of vehicles (d) moderate expansion in compensation
20. The recipe for computing value versatility of interest coefficient is
    (a) $\frac{\text{Rate change in cost}}{\text{Rate change in amount requested}}$
    (b) $\frac{\text{Absolute rate change in amount requested}}{\text{Rate change in cost}}$
    (c) $\frac{\text{Rate change in amount requested}}{\text{Rate change in cost}}$
    (d) $\frac{\text{Rate change in amount requested}}{\text{Decrease in price}}$
21. The capacity Q gives the interest for beans in packs – 36 + 0.4P = 0. Where P is a cost in naira and Q is the amount, discover Q when P = N20. (a) 12 sacks (b) 24 packs (c) 28 sacks (d) 30 sacks.
22. When the cost of product increments and the amount requested additionally expands, this is an instance of (a) extraordinary interest (b) inferred request (c) cutthroat interest, (d) joint interest.



23. The graph above outlines (a) totally flexible interest (b) inelastic interest (c) completely inelastic interest (d) versatile interest.
24. The price elasticity coefficient indicates (a) how far a business can reduce cost (b) the degree of competition (c) the degree to which the interest bend shifts (d) consumer responsiveness to price changes.
25. Governments impose taxes mainly to (a) punish the citizens (b) provide social amenities (c) donate to poorer countries (d) execute white elephant projects
26. Given the demand function Qd = 20 – 1/2P. What is Qd when P is ₦12? (a) 6 units (b) 10 units (c) 12 units (d) 14 units.
27. The market cost of ware is controlled by the (a) all outnumber of individuals on the lookout (b) complete interest for the item provided (c) amount of the ware supplied (d) interaction of demand and supply.
28. Tax evasion means (a) postponing payment of tax (b) tax payment according to the ability to pay (c) making false declaration of taxable income (d) paying a little amount of money as tax
29. When the price versatility of supply is equivalent to 0.4, supply is supposed to be (a) inelastic, (b) flexible (c) unitary flexible (d) completely flexible.
30. All coming up next are explicit instances of circuitous expenses with the exception of (a) import obligation, (b) survey charge (c) trade obligation (d) excise duty.
31. Given that the allowable expense is ₦500.00 variable expense is ₦1000.00 and yield is 50 units. What will be the normal expense of creating one unit? (a) ₦2000.00 (b) ₦60.00 (c) ₦50.00 (d) ₦40.00.
32. Which of coming up next is viewed as fixed expense? (a) Cost of crude materials (b) Labor Wages (c) Cost of light (d) Rent ashore.
33. A general public that is on its creation acceptability contort (a) has accomplished full business in any case not full creation (b) has achieved full creation yet rather not full work (c) has accomplished both full business and full creation (d) has a lower yield level than it should to have.
34. Production isn't finished until the (a) stock get the wholesalers (b) items show up at the last buyer (c) components of creation are merged (d) wholesalers request that the organizations produce.

35. If AC = Average expense of creation, FC = Fixed expense of creation, VC = Variable expense of creation, TC = Total expense of creation then, at that point (a) VC =TC/FC (b) VC = TC – FC (c) VC = FC + AC (d) VC = TC – AC.
36. In amazing contest, the minimal expense bend crosses the normal expense bend (a) from underneath at its absolute bottom (b) from above at its absolute bottom (c) from beneath before the absolute bottom (d) beneath after the absolute bottom.
37. Which of coming up next isn't valid for a firm in harmony condition in wonderful contest? (a) MC is rising (b) MC bend cuts AC bend from underneath (c) MR>AR (d) MC = AC.
38. In production, the formula: $\frac{\text{Total product}}{\text{No. of men employed}}$ is utilized to compute the (a) absolute item (b) normal item (c) peripheral item (d) fixed item.
39. Dividing absolute variable expense by amount of yield gives (a) Total Cost (TC) (b) Total Fixed Cost (TFC) (c) Variable Cost (VC) (d) Average Variable Cost (AVC)
40. Wages are somewhat, controlled by the (a) minimal utility of work (b) normal utility of work (c) peripheral usefulness of work (d) all out yield of work.
41. Average Variable Cost (AVC) bend (a) is U-formed (b) ascends from left to right (c) inclines upwards (d) is level to the X-pivot.

Utilize the table beneath to respond to questions 41, 42 and 43

Units of variable factors	**Total Product**
1	25
2	31
3	40
4	48
5	55

42. The minor item at the fourth factor is (a) 12 (b) 9 (c) 8 (d) 6.
43. The contrast between the most elevated and the most un-minor result of the variable factor is (a) 3 (b) 8 (c) 10 (d) 12.
44. The normal result of the variable factor when four units are utilized is (a) 6 (b) 8 (c) 12 (d) 48.
45. The expense brought about by utilizing both fixed and variable components underway is known as (a) minor expense (b) fixed expense (c) all out cost (d) normal expense.
46. Physical usefulness is influenced by all the underlisted factors aside from the (a) condition of innovation (b) amount of information sources (c) nature of data sources (d) cost of yield.
47. Marginal expense can be gotten from the (a) absolute item (b) complete income (c) all out cost (d) normal fixed expense.

48. The idea of chance expense is essential to the firm since it (a) decides the costs of the association's items (b) builds the degree of yield of the firm (c) prompts most extreme fulfillment of the purchasers (d) guides firms in apportioning scant assets.
49. If the proper expense of a firm is ₦800 and its variable expense is ₦2700 while its absolute yield is 100 units, what is the normal expense of the firm? (a) ₦25 (b) ₦35 (c) ₦45 (d) ₦50
50. Given that TR is absolute income, the TRn-TR(n-1) can be utilized to track down the (a) minor income (b) peripheral expense (c) normal expense (d) normal income.

ECONOMICS DIAGNOSTIC TEST (EDT)

(ESSAY)

INSTRUCTION

You are to attempt all the questions by choice the most appropriate option from the list. You have 40 minutes to attempt the question.

1. The solicitation and supply limit of a thing are given as follows: Amount referenced (Qd) = 20 - 2P Quantity gave (Qs) = 6P - 12 where P = cost in naira
   a.) Determine the amicability cost and total traded that cost
   b.) If the expense of the thing is fixed at N6.00, what is the size of the bounty supply? (WAEC Question 2, 1990)

1. The table beneath shows the assessment installments of four pay workers in a year. Utilize the data in the table to address the inquiries that follow:

Income Earners	Income Base	Tax payments	
		A	B
	₦	₦	₦
Jawara	15,000.00	1,500.00	1,200.00
Ade	25,000.00	2,500.00	2,000.00
Eke	32,000.00	3,200.00	2,240.00
Audu	60,000.00	6,000.00	3,000.00

a) determine the percentage rate of taxation paid by (i) Jawara in columns A and B (ii) Audu in columns A and B (iii) Ade in column B (iv) Eke in columns B
b) (i) identify the systems of taxation employed in columns A and B
   (ii) Which of the pay workers have minimal weight under section B?
c) (i) If government increases its rate of taxation to 15% flat rate, how much revenue will be generated from the payees?
   (ii) at 15% flat rate taxation, calculate the disposable incomes of MessrsJawara, Ade, Eke and Audu. (WAEC Question 2, 2003)

2. From the table underneath, answer the accompanying inquiries:

Output of Beans (Kg)	Total Revenue (₦)	Marginal Revenue (₦)	Total Cost (₦)	Marginal Cost (₦)
10	150	-	250	-
20	200	5	300	5
30	350	15	430	13
40	450	J	500	7
50	550	5	550	K
60	600	5	580	3
70	630	Y	700	12

(a) Find the values of J, K and Y

(b) (i) what might be the advantage helping consequence of this firm

(ii) If this firm were working under challenge, what might be the cost of its thing? (WAEC Question 2, 1988)

3. The table beneath addresses the yield level of a specific firm creating sodas. Utilize the data in the table to address the inquiries that follow.

Output (Units)
0
12
23
36
48
58

Given the expense condition of the firm in Naira as C = 20 + 2q, where C is complete expense and q is amount delivered, figure:

(a) The complete expense of delivering (i) 12 units of yield (ii) 36 units of yield

(b) The normal expense when: (i) 48 units were created (ii) 58 units were delivered

(c) The peripheral expense when: (i) 23 units were delivered (ii) 36 units were created

(d) If the firm is working in an entirely serious market and the market cost is N5 per unit, decide the benefit when (i) 23 units were created (ii) 48 units were delivered (WAEC Question 2, 2004)

Marking Guide for Economics Diagnostic Test (EDT- Objective)

1. C	2. C	3. D	4. A	5. A	6. A	7. B	8. D	9. C	10. B
11. D	12. A	13. B	14. B	15. C	16. D	17. C	18. B	19. B	20. C
21. C	22. A	23. D	24. D	25. B	26. D	27. D	28. C	29. A	30. B
31. D	32. D	33. C	34. B	35. B	36. A	37. C	38. B	39. D	40. C

41. A 42. C 43. A 44. C 45. C 46. D 47. C 48. D 49. B 50. A

Marking Guide for Economics Diagnostic Test (EDT- Essay)

The following steps should be taken in answering this set of items:

Question 1:

a) **Step 1**: To determine the equilibrium price

Equilibrium: Qd = Qs

20 – 2p = 6p – 12

20 + 12 = 6p + 2p

8p = 32

p = ₦4 **1mark**

Step 2:To determine the quantity bought at that price

Demand function: (Qd) = 6p -12

= 24 -12

= 12 **1mark**

Step 3:To determine the quantity bought at that price

Supply function: (Qs) = 20 – 2p

= 20 – 8

= 12

1mark

b) Fixed price of commodity (p) = ₦6

The magnitude of the excess supply = Qs – Qd

Step 1: To determine the quantity supplied (Qs)

Qs= 6p – 12,

= 6 X 6 – 12

= 36 – 12

= 24 units **1mark**

Step 2: To determine the quantity demanded (Qd)

Qd = 20 -2p

= 20 – 2X6

= 20 -12

= 8 units **1mark**

Step 3: To determine the magnitude of the excess supply (Es)

Es = Qs – Qd

Es = 24 – 8

= 16 units **1mark**

Question 2:

Step 1: State the formula for tax rate as

Tax payment X100
Tax base 1

i) Tax rate by Jawara in column A:

1500 X100 = 150000 = 10% **1mark**
15000 1 15000

Tax rate by Jawara in column B:

1200 X100 = 120000 = 8% **1mark**
15000 1 15000

ii) Tax rate by Audu in column A

6000 X100 = 600000 = 10% **1mark**
60000 1 60000

Tax rate by Audu in column B:

3000 X100 = 300000 = 5% **1mark**
60000 1 60000

iii) Tax rate by Ade in column B:

2000 X100 = 200000 = 8% **1mark**
25000 1 25000

iv) Tax rate by Eke in column B:

2240 X100 = 224000 = 7% **1mark**
32000 1 32000

b) i) Column A: Proportional system of taxation **1mark**
ii) Column B: Regressive system of taxation **1mark**

c) i) When government increases tax rate to 15%
Jawara will pay:

15 X₦15000 = ₦225000 = ₦2,250.00 **1mark**
100 1 100

Ade will pay:

15 X₦25000 = ₦375000 = ₦3,750.00 **1mark**
100 1 100

Eke will pay:

15 X₦32000 = ₦480000 = ₦4,800.00 **1mark**
100 1 100

Audu will pay:

15 X₦60000 = ₦900000 = ₦9,000.00 **1mark**
100 1 100

ii) Disposable income = Income – taxation (at 15% flat rate)
For Jawara:

₦15,000.00 – ₦2,250 = ₦12,750.00 **1mark**

For Ade:

₦25,000.00 – ₦3,750.00= ₦21,250.00 **1mark**

For Eke:

₦25,000.00 – ₦4,800.00= ₦27,200.00 **1mark**

For Audu:

₦60,000.00 – ₦9,000.00= ₦51,000.00 **1mark**

Question 3:

a. To find F, note that MR is the contribution of the last unit to total revenue i.e

iii. **Step 1**: To determine the F:

F = ΔTR/ΔQ= 100/10 (i.e 450 -350)/(i.e 40 -30) = ₦10 **1mark**

iv. **Step 2**: To determine the M:

M= ΔTR/ΔQ = (550 -500)/(50 - 40) = 50/10 = ₦5 **1mark**

v. **Step 3**: To determine the X:

X = ΔTR/ΔQ = (630-600)/(70-60) = 30/10 = ₦3 **1mark**

b. i. **Step 1:** The firm will maximise profit at the output level where MR =MC. That is when output is 50kg.

1mark

ii. **Step 2:** If the firm were operating under perfect competition then P = MR=MC. Hence, the price of its product would be ₦5

1mark

Question 4:

a. Given the expense condition of a firm as C = 20 +2p where C = total cost, q = quantity demanded

i. **Step 1: To calculate for 12 units**,

C = 20 + 2(12)

= 20 + 24 = ₦44 **1mark**

TC for 12 units is **₦44**

ii. **Step 2: To calculate for 36 units,**

C = 20 + 2(36)

= 20 + 72 = ₦92 **1mark**

TC for 36 units is **₦9**2

b. **To find AC, Average Cost = Total Cost/Quantity**

i. **Step 1**: To find AC when 48 units were produced

AC =Total Cost/Quantity

TC = 20 + 2(48)

=20 + 96 = 116

AC = ₦116/48 = **₦2.42** **1mark**

ii. **Step 2:** To find AC when 58 units were produced

AC = **Total Cost/Quantity**

TC = 20 + 2(58)

=20 + 116 = 136

AC = ₦136/58 = **₦2.34** **1mark**

c. **To find Marginal Cost, MC = $(TC_2-TC_1)/(q_2 – q_1)$**

i. **Step 1**: To find Marginal cost when 23 units were produced

MC = $(TC_2-TC_1)/(q_2 – q_1)$

At 23 units, TC_2 = ₦66, TC_1 = ₦44

MC = (66 - 44)/(23 -12)

= 22/11 = **₦2** **1mark**

ii. **Step 2:** To find Marginal cost when 36 units were produced

MC = $(TC_2-TC_1)/(q_2 – q_1)$

At 23 units, TC_2 = ₦92, TC_1 = ₦66 q_2 = 36 units and q_1 = 23units

MC = (92 - 66)/(36 -23)

= 26/13 = **₦2** **1mark**

d. If the firm is working in an entirely aggressive market and the market value i₦5 per unit, decide the benefit when i.) 23 units were created ii.) 48 were delivered

To determine the Profit:

Profit = Total revenue – total cost

i. **Step 1:** To determine the profit when 23 units were produced

TR = TC

TR = N5 x 23units = ₦115

TC = 20 + 2q

= 20 + 2(23)

= 20 + 46 = ₦66

Profit = TR - TC

₦115 - ₦66= **₦49** **1mark**

ii. **Step 2:** To determine the profit when 48 units were produced

TR = ₦5 x 48units = ₦240

TC = ₦20 + ₦96 = ₦116

Profit = TR - TC

₦240 - ₦116= **₦124** **1mark**

APPENDIX IV

THE INTERNATIONAL CENTRE FOR EDUCATIONAL EVALUATION (ICEE)
INSTITUTE OF EDUCATION,
UNIVERSITY OF IBADAN, IBADAN, NIGERIA

QUANTITATIVE ECONOMICS ACHIEVEMENT TEST (QEAT- Objectives)

This test will aim at assessing the understanding level of students. Please, relax and be at your best. The result of this exercise will be used for research purpose only.

INSTRUCTION

You are to endeavor every one of the inquiries by picking the most appropriate option from the list. Each question is trailed by four choices letter (a) to (d). Discover the right choice for each question and circle the letter that represents your response to each question. Circle only one option to each question.

You have 20 minutes to attempt the questions.

1. Given that decent expense is ₦500.00, variable expense is ₦1500.00 and yield is 50units, what will be normal expense of creating one unit? (a) ₦2000 (b) ₦60.00 (c) ₦50.00 (d) ₦40.00.
2. Mr. Bala's pay is ₦800.00 each month while that of Mr. Jatau is ₦1,200. In the event that Messrs Bala and Jatau pay ₦80.00 and ₦120.00 individually as assessments, the expense framework is (a) reformist (b) backward (c) corresponding (d) advertisement valorem.
3. Opportunity expense is characterized as the (a) Money cost (b) cost of creation (c) genuine expense (d) Variable expense
4. Which of coming up next is the right method to compute absolute expense? (a) Addition of fixed expense for variable expense (b) Division of absolute expense by complete yield (c) Duplication of fixed expense by factor cost (d) Subtraction of fixed expense from full scale cost
5. Mr Idowu needs a TV and a cooler. Each cost ₦500.00, the particular total he has. In the event that Mr Idowu purchases the TV, the cooler would be viewed

as the (a) minimal expense (b) sub-par thing (c) opportunity cost (d) advantageous expense.

6. All coming up next are explicit illustration of circuitous duties with the exception of (a) import obligation (b) survey charge (c) trade obligation (d) extract obligation.
7. In amazing rivalry, the minimal expense bend cross the normal expense bend (a) from underneath at its absolute bottom (b) from above at its absolute bottom (c) from beneath before the absolute bottom (d) from underneath after the absolute bottom.
8. The cash installment made to proprietors of land and work are (a) lease and wages (b) premium and benefit (c) wages and premium (d) profit and pay
9. Which of the accompanying mix of characteristics guarantees a decent assessment framework? (a) Deflationary, value, conviction and comfort (b) Economy, accommodation, assurance and value (c) Economy, deflationary, inflationary and sureness (d) Economy, accommodation, sureness and inflationary.
10. Average Variable Cost (AVC) bend (a) is U-molded (b) ascends from left to right (c) slants upwards (d) is level to the X-hub.
11. The frequency of an expansion in charge on a product with entirely inelastic interest will be on the (a) distributer (b) retailer (c) Government (d) buyer
12. The expense caused by utilizing both fixed and variable components underway is known as (a) minimal expense (b) fixed expense (c) absolute expense (d) normal expense.
13. Government income will increment in case charge is forced on a decent whose request is (a) flexible (b) inelastic (c) unitary versatile (d) completely versatile.
14. The expense which a firm will bring about if it is underway, is alluded to as (a) normal expense (b) variable expense (c) opportunity cost (d) fixed expense.
15. Which of coming up next are immediate duties? (a) deals charges (b) extract obligations (c) pay and friends charges (d) taxes obligations.
16. Marginal expense can be gotten from the (a) absolute expense (b) complete income (c) all out cost (d) normal fixed expense.
17. The idea of chance expense is essential to the firm since it (a) decides the costs of the association's items (b) expands the degree of yield of the firm (c) prompts

greatest fulfillment of the customers (d) guides firms in apportioning scant assets.

18. Which of the accompanying mix of characteristics guarantees a decent duty framework? (a) Deflationary, value, conviction and accommodation (b) Economy, comfort, assurance and value (c) Economy, deflationary, inflationary and sureness (d) Economy, comfort, conviction and inflationary.
19. The benefit of the maker can be determined as (a) all out cost less absolute income (b) normal income less normal expense (c) complete income less all out cost (d) minimal income less peripheral expense.
20. The more prominent weight of the assessments on fundamental products is borne by the (a) center pay bunch (b) big league salary bunch (c) low pay bunch (d) hardly any top rich individuals.
21. Which of coming up next is viewed as fixed expense? (a) Expenditure on crude materials (b) Expenditure on fuel (c) consumption on power (d) lease ashore.
22. The rate of an expansion in charge on a ware with entirely inelastic interest will be on the (a) distributer (b) retailer (c) Government (d) buyer
23. Which of the accompanying doesn't change in short run? (a) variable expense (b) peripheral expense (c) all out cost (d) fixed expense
24. The idea of short-run and since a surprisingly long time prior run periods is responsible for social affair costs into (a) fixed and variable (b) comprehended and unequivocal (c) typical and total (d) money and opportunity.
25. Disposable pay is absolute pay (a) less duty (b) separated by charge (c) in addition to burden (d) duplicated by charge
26. Which of the accompanying will have seriously destabilizing effect on the economy? (a) a duty on the costs of vehicle (b) an assessment on petroleum (c) a reduction in the stock of vehicles (d) moderate expansion in compensation
27. Governments imposes taxes mainly to (a) punish the citizens (b) provide social amenities (c) donate to poorer countries (d) execute white elephant projects
28. Tax evasion means (a) postponing payment of tax (b) tax payment according to ability to pay (c) making false declaration of taxable income (d) paying little amount of money as tax

29. Tax evasion in Economics means (a) false declaration of assets (b) paying tax only as and when due (c) declaration of assets (d) tax payment according to income received.
30. A tax is said to be good when (a) it yields more revenue to the state at the expense of the people's ability to pay (b) the cost of collecting it is equal to the revenue it generates (c) it is imposed so suddenly that no one can dodge its payment (d) its payment causes minimum inconvenience to the tax payer.

QUANTITATIVE ECONOMICS ACHIEVEMENT TEST (QEAT- Essay)

This test will aim at assessing the theoretical and numerical ability of student. Please, relax and be at your best. The result of this exercise will be used for research purpose only.

Instruction

You are to attempt all the questions by choice the most appropriate option from the list. You have 25 minutes to attempt the question.

1. The table underneath addresses the yield level of a specific firm creating soda pops. Utilize the data in the table to respond to the inquiries that follow.

Output (Units)
0
12
23
36
48
58

Given the expense condition of the firm in Naira as C = 20 + 2q, where C is all out cost and q is amount delivered, ascertain:

a. The all out cost of delivering 12 units of yield
b. The normal expense when 58 units were delivered
c. The minor expense when23 units were delivered
d. If the firm is working in a totally serious market and the market cost is N5 per unit, decide the benefit when 48 units were delivered (WAEC Question 2, 2004)

a. What is personal income tax?
b. Mr. Adeolu, whose annual income was ₦157,800.00, was granted 20% as rebate on his marital status of having 4 children.

i. Calculate his annual income rebate.

ii. What is the taxable income?

iii. Calculate his annual income tax on 15%.

Marking Guide for Economics Achievement Test (EAT- Objectives)

1. D	2. C	3. C	4. A	5. C	6. B	7. A	8. A	9. B	10. A
11. D	12. C	13. B	14. D	15. C	16. C	17. D	18. B	19. C	20. C
21. D	22. D	23. D	24. A	25. A	26. B	27. B	28. C	29. A	30. D

Marking Guide for Economics Achievement Test (EAT- Essay)

The following steps should be taken in scoring this set of items:

Question 1:

a. Given the cost equation of a firm as C = 20 +2p where C = total cost, q = quantity demanded**: To calculate for 12 units**,

C = 20 + 2(12)

= 20 + 24 = ₦44 **1mark**

TC for 12 units is **₦44**

b. **To find AC, Average Cost = Total Cost/Quantity**

To find AC when 58 units were produced

AC = **Total Cost/Quantity**

TC = 20 + 2(58)

=20 + 116 = 136

AC = ₦136/58 = **₦2.34** **1mark**

c. **To find Marginal Cost, MC = $(TC_2-TC_1)/(q_2 – q_1)$:** To find Marginal cost when 23 units were produced

MC = $(TC_2-TC_1)/(q_2 – q_1)$

At 23 units, TC_2 = ₦66, TC_1 = ₦44

MC = (66 - 44)/(23 -12)

= 22/11 = **₦2** **1mark**

d. If the firm is working in an entirely aggressive market and the market value i₦5 per unit, decide the benefit when i.) 23 units were delivered ii.) 48 were created

To determine the Profit:

Profit = Total revenue – total cost

To determine the profit when 48 units were produced

TR = ₦5 x 48units = ₦240

TC = ₦20 + ₦96 = ₦116

Profit = TR - TC

₦240 - ₦116= **₦124** **1mark**

Question 2:

a. Personal income tax is the types of tax levied on the income of an individual, usually during a period of one year. In this type of tax system, individuals are granted certain rebates such as whether married, number of children, etc and balance of the income is then taxed.

b. To find the annual income tax:

i: Calculate for annual income rebate

Annual Income X income rebate rate (20%)

$$\frac{₦157800}{1} \times \frac{20}{100}$$

$$= \frac{₦3156000}{100}$$

= ₦31,560.00

The granted rebate was ₦31,560.00 **1 mark**

ii: Calculate for taxable income

Taxable income (TI) = Total income – Granted rebate

TI = ₦157,800.00 – ₦31,560

TI = ₦126,240.00 **1 mark**

iii: To find the value for annual income tax

Annual Income Tax (AIT) = Taxable Income X Tax rate (15%)

$$\frac{₦126240}{1} \times \frac{15}{100}$$

$$= \frac{₦1893600}{100}$$

= ₦18,936.00

AIT = ₦18,936.00 **1 mark**

APPENDIX V

THE INTERNATIONAL CENTRE FOR EDUCATIONAL EVALUATION (ICEE)
INSTITUTE OF EDUCATION,
UNIVERSITY OF IBADAN, IBADAN, NIGERIA

NUMERICAL ABILITY TEST

This is a testto perceive how youcan control numbers. Itcontains inquiries of various types. Write your ANSWER BEFORE EACH QUESTION.

Instructions*: You have **10 minutes** to attempt the test. Try each question as you can. Try not to invest an excess of energy on any inquiry.*

Table 1:

INCOME OF INDUSTRIES (in billions of Naira)					
Industry	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Financial Services	70	82	92	100	110
Telecommunications	17	20	21	23	24
Engineering	33	40	44	49	54
Agriculture	26	28	28	32	53
Manufacturing	193	198	206	233	267
Transportation	38	41	44	47	51

Use table 1 to answer question 1 to 9

1. Which industry had the biggest expansion in the Naira measure of pay from Year 3 to Year 4? _____
2. Which industry had the littlest expansion in the Naira measure of pay from Year 1 to Year 5? _____
3. Which industry encountered the biggest rate increment from Year 4 to Year 5? _____
4. Which industry had the least rate change from Year 1 to Year 4?
5. a) If the pattern in the Transportation business were to proceed, record the most probable pay for Year 6. _____

   b) Which of the above businesses would you discover hard to foresee a sensibly precise figure for Year 6? _____

6. Which kind of industry shows the steadiest speed of advancement in pay during this season of five years? _____
7. In what number of occasions did a kind of industry make an addition of 10% or more over the earlier year recorded? _____
8. Find all businesses that expanded their individual earnings by over 20% from Year 1 to Year 3. _____
9. Find the normal pay of every industry over the initial three years and throughout the most recent four years. Your answers ought to be to two decimal spots. _____

Marking Guide for Numerical Ability Test:

1. **Answer: Manufacturing (increase of 27 billion euros).**

INCOME OF INDUSTRIES (in billions of Naira)					
Industry	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Financial Services	70	82	**92**	**100**	110
Telecommunications	17	20	**21**	**23**	24
Engineering	33	40	**44**	**49**	54
Agriculture	26	28	**28**	**32**	53
Manufacturing	193	198	**206**	**233**	267
Transportation	38	41	**44**	**47**	51

2. **Answer: Telecommunications (increase of 7 billion euros).**

INCOME OF INDUSTRIES (in billions of Naira)					
Industry	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Financial Services	**70**	82	92	100	**110**
Telecommunications	**17**	20	21	23	**24**
Engineering	**33**	40	44	49	**54**
Agriculture	**26**	28	28	32	**53**
Manufacturing	**193**	198	206	233	**267**
Transportation	**38**	41	44	47	**51**

3. **Answer: Agriculture – increase of 65.63%**

INCOME OF INDUSTRIES (in billions of Naira)					
Industry	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Financial Services	70	82	92	**100**	**110**
Telecommunications	17	20	21	**23**	**24**
Engineering	33	40	44	**49**	**54**
Agriculture	26	28	28	**32**	**53**
Manufacturing	193	198	206	**233**	**267**
Transportation	38	41	44	**47**	**51**

4. **Answer: Manufacturing, increase of 20.73% years 1 to 4**

INCOME OF INDUSTRIES (in billions of Naira)					
Industry	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Financial Services	**70**	82	92	**100**	110
Telecommunications	**17**	20	21	**23**	24
Engineering	**33**	40	44	**49**	54
Agriculture	**26**	28	28	**32**	53
Manufacturing	**193**	198	206	**233**	267
Transportation	**38**	41	44	**47**	51

5. **(a) Prediction for Transportation in Year 6? 55 or 54**

Industry	**Yr2-1**	**Yr3-2**	**Yr4-3**	**Yr5-4**	**Yr6-5**
Financial Services	12	10	8	10	10
Telecommunications	3	1	2	1	2 or 1
Engineering	7	4	5	5	5
Agriculture	2	0	4	21	?
Manufacturing	5	8	27	34	?
Transportation	3	3	3	4	4 or 3

(b.) Make a gauge for Year 6 for every industry–compose a question mark if hard to anticipate. So we see that making expectations on Agriculture and Manufacturing is absurd without more information for example information on the monetary cycle and so forth

6. **Industry with steadiest rate of growth: Transportation**

Industry	**Yr2-1**	**Yr3-2**	**Yr4-3**	**Yr5-4**	**Yr6-5**
Financial Services	12	10	8	10	10
Telecommunications	3	1	2	1	2 or 1
Engineering	7	4	5	5	5
Agriculture	2	0	4	21	?
Manufacturing	5	8	27	34	?
Transportation	3	3	3	4	3 or3

7. *So, we have found that there are 12 examples of an expansion of 10% over time across all ventures.*

Industry	**Yr2-1**	**Yr3-2**	**Yr4-3**	**Yr5-4**	**10% or more**
Financial Services	Y	Y	N	Y	**3**
Telecommunications	Y	N	N	N	**1**
Engineering	Y	Y	Y	Y	**4**
Agriculture	N	N	Y	Y	**2**
Manufacturing	N	N	Y	Y	**2**
Transportation	N	N	N	N	**0**
Total Number of instances of 10% or more increases					**12**

8. Financial services, Telecommunications and Engineering are industries that have increased by more than 20% from Year 1 to Year 3 31.4%, 23.5% and 33.3% respectively.
9. Averages in billions of Naira for Years 1, 2 and 3. Averages for Years 2, 3, 4 and 5.

Industry	**First Three years (Average)**	**Last Four Years (Average)**
Financial Services	81.33	96.00
Telecommunications	19.33	22.00
Engineering	39	46.75
Agriculture	27.33	35.25
Manufacturing	199	226.00
Transportation	41	45.75

APPENDIX VI

THE INTERNATIONAL CENTRE FOR EDUCATIONAL EVALUATION (ICEE)
INSTITUTE OF EDUCATION,
UNIVERSITY OF IBADAN

TUTOR'S MANUAL FOR

DECLARATIVE KNOWLEDGE APPROACH GROUP

Contact1

Topic: Theory of Costs and Revenue
Subtopic: Definition of cost of production and basic cost concepts and Relationship between total, average and Marginal costs
Class: S.S. 2
Duration: 40 minutes

Performance Objectives

Toward the end of the illustration, the students should be able to:

a. define cost of production
b. list and explain basic cost concepts
c. identify the relationship between Total, Average and Marginal cost

- **DEFINITION: COST OF PRODUCTION**

Cost of creation may be portrayed as the sum of the overall huge number of portions to the factors of creation used in the formation of work and items. For work and items to be made, all of the four factors of creation, which are land, capital, work and financial specialist, ought to participate. The various costs achieved in the use of these factors of creation to convey work and items are implied as cost of creation. Cost of creation can likewise be connected with every one of the prizes because of part of creation, which integrate rent, for land wages and pay rates for works, premium for capital and advantage for financial specialist.

Essential Expense Ideas

(1) Fixed Expense (FC): Fixed cost also called above cost or undeniable cost is described as the cost or costs that stays unaltered whatever the level of yield. It essentially suggests the cost of an endeavor which doesn't change with change of yield. Accordingly, fixed cost doesn't change with the developing yield. Hence, regardless of the amount of item created, fixed cost continues as before. Fixed cost can be addressed by a diagram as displayed in Fig. 23.1. Instances of fixed cost are the expense of structures, land, engine vehicles and plant and apparatus. Fixed cost is determined by this equation:FC = TC – VC

OR

TFC = AFC x Quantity produced

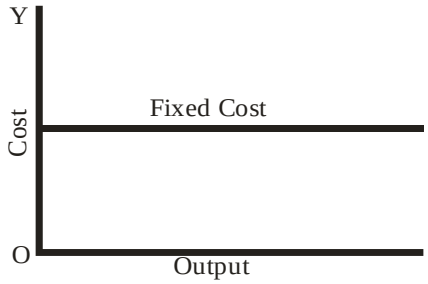


Fig 23.1: Fixed cost (FC)

(2) Flexible cost (VC): Adaptable expense, moreover called direct cost, is described as the cost of creation which moves or changes straight forwardly with the level of yield. Variable expense tends to ascend as all the more a ware is created and decrease as less of the item is produce. Variable expense can be addressed by a chart as displayed in Fig. 23.2. Instances of unrefined components, work and so forth factor cost is determined by this equation: VC = TC - FC

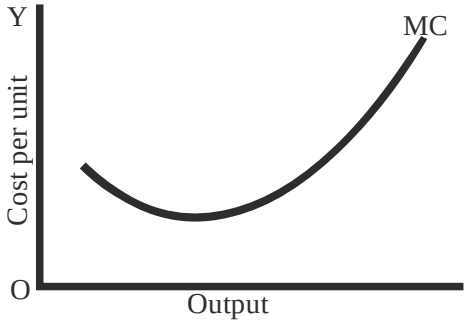


Fig 23.2: Variable cost (VC)

(3) Entire Cost (TC): Whole expense may be portrayed as the hard and fast measure of fixed and variable costs achieved by an endeavor in the making of a particular thing. All out cost, addressed in Fig. 23.3, is comprised of two sections: all out fixed cost (TFC) and absolute factor cost (TVC). Absolute expense can be determined with this recipe: TC = FC + VC or TC = ATC x Q.

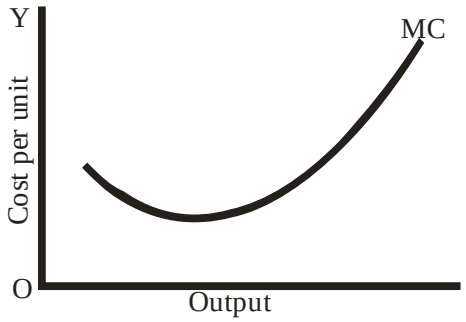
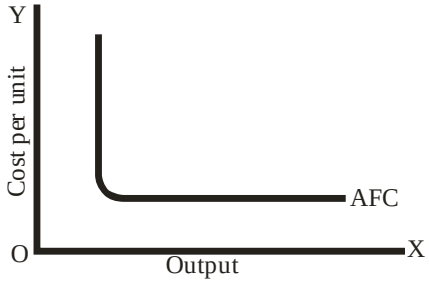


Fig 23.2: Variable cost (VC)

(4) Usual cost (AC) or Usual Total cost (ATC): Normal expense is described as a cost for every unit of yield or the full scale cost of making of a thing brought about by an endeavor isolated by the amount of units of yield. Normal absolute expense (ATC) is partitioned into normal fixed costs (AFC) and normal variable expenses



(AVC). ***Fig 23.2: Average cost (AC)***

Normal expense (AC: is determined by partitioning the absolute expense by the all out number of results delivered. Normal expense, which is addressed graphically in Fig. 23.4, is determined by this equation:

AC = $\frac{Total\ Cost\ (TC)}{Total\ Output\ (TQ)}$

OR

ATC = AFC + AVC

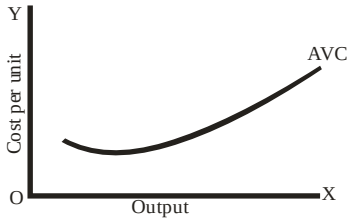


Fig 23.5: Average Variable Cost (AVC)

(5) Usual Flexible costs (AVC): The typical variable expense might be characterized as the expense per unit of variable expense of result. As creation increments, normal variable expense might rise or fall. The typical variable expense, which can be addressed graphically in Fig. 23.5 is gained by secluding indisputably the quantity of results. It is determined by this recipe:

AVC = $\frac{TVC}{TQ}$ = ATC – AFC

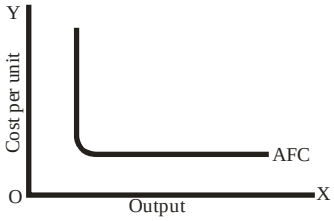


Fig 23.6: Average fixed cost (AFC)

(6) Usual static cost (AFC): Normal fixed cost might be portrayed as the legitimate cost of conveying a unit of yield. It is addressed graphically in Fig. 23.6. Normal fixed cost is gotten by separating fixed cost (FC) by the quantity of units of result as reflected in this equation:

AFC = $\frac{TFC}{Unit\ of\ output\ (Q)}$ = ATC – AVC

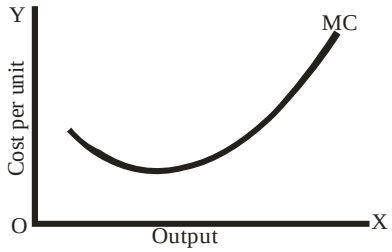


Fig 23.7: Marginal cost (MC)

(7) Marginal Cost (MC): Peripheral expense, in like manner called steady cost, may be described as the extra cost of augmentation yield by another unit. With everything taken into account, minor (peripheral) cost is the expense contrast in conveying an additional unit of an endeavor's yield. For instance, if the cost of conveying 20 tubers of sweet potato is N50.00 and it cost N60.00 to deliver 21 tubers of a similar sweet potato, the N10.00 contrast in cost is known as peripheral expense. Peripheral expense is addressed graphically in Fig. 23.7 and is determined utilizing the recipe:

$$MC = \frac{Changes\ in\ TC}{Changes\ in\ output} = \frac{\Delta TC}{\Delta Q}$$

- **RELATIONSHIP BETWEEN TOTAL AVERAGE AND MARGINAL COSTS**

The various kinds of expenses are interrelated in various ways.

(1) The normal expense is gotten when the complete expense is separated by the absolute result.

(2) The normal fixed cost when added to the typical variable expense gives the complete expense.

(3) The negligible expense is gotten from the distinction between two back to back add up to costs.

(4) Marginal cost is comparable to average cost when the typical cost is at its outright base.

(5) As the outright cost increases, insignificant cost tumbles partially at which ordinary cost is least.

Rehearsing Activities

1. Average cost is (a) the outright cost of creation (b) the extra cost of passing on an additional one thing of result (c) the cost of passing on a unit of result (d) adaptable cost (e) above cost

2. Marginal expense is (a) the least expense of conveying stock (b) the expense of making of the most able firm in an industry (c) the expense of creation of the most wasteful firm in an industry (d) the expense of development of the last or additional unit of item made by a firm (e) the expense of creation at which the base benefit is gotten by a firm If

AC = Normal Expense of creation

TC = Absolute Expense of creation

VC = Variable Expense of creation

FC = Fixed Cost of creation

Q = Amount of merchandise created

Then **(a) AC = $\frac{\mathbf{TC}}{\mathbf{Q}}$;** **TC = VC + FC**

(b) AC = (TC)Q; TC = VC + FC

(c) AC = $\frac{TC}{Q}$; TC = (VC)(FC)

(d) AC = TC – FC; VC = TC – AC

(e) AC = $\frac{TC}{Q}$; TC = VC + AC

1. Let TC = absolute expenses
   TVC = absolute factor costs
   TFC = all out fixed expenses
   ATC = normal all out costs
   AVC = normal variable expenses
   AFC = normal fixed expenses
   Q = yield
2. Which of these is NOT true? (a) TC = TFC + TVC (b) ATC = AVC + AFC (c) AFC = $\frac{TFC}{Q}$**(d) TVC = $\frac{\mathbf{AVC}}{\mathbf{Q}}$** (e) AVC = $\frac{TVC}{Q}$
3. Usualstatic cost is (a) Average total cost les how much typical variable cost (b) a large portion of the amount, everything being equal (c) absolute fixed expense separated by the degree of yield (d) all out fixed expense in addition to minimal expense
4. By definition, variable expenses (VC) is identified with complete expenses and fixed expenses (FC) by the condition (a) VC = TC + FC (b) VC = TC – FC (c) VC = TC/FC (d) VC = (TC)(FC)
5. If an absolute expense bend is plotted, minimal expense can be outlined by the (a) slant of the digression to the bends at some random yield (b) U-formed bend reducing the complete expense bend at its lowe.st point (c) straight line from the beginning to the mid-point of the bend (d) straight line cutting the bend at its most noteworthy point
6. In a material plant, the expense of cotton utilized is a commonplace illustration of (a) a normal expense (b) a variable expense (c) a complete expense (d) a decent expense
7. At any given degree of yield, a company's complete variable expense approaches (a) absolute expense less minor expense (b) all out cost less all out fixed expenses (c) all out cost less normal expense (d) normal variable expense and minimal variable expense
8. The just factor of creation that assumes a functioning part in the creation cycle is (a) land (b) capital (c) business person (d) work
9. Marginal expense bend crosses normal expense bend (a) from above at its absolute bottom (b) from beneath before the absolute bottom (c) from underneath at its absolute bottom (d) from beneath after the absolute bottom (e) at zero point

10. Total fixed expense estimates the expense of (a) all plant and apparatus (b) all resources where amount can't be shifted in the short run (c) all resources whereupon the firm has control (d) property claimed by the firm
11. Which of coming up next is Valid at the amount of yield where Normal Expense (AC), per unit has arrived at its base level? (a) AVC = FC (b) MC = AVC (c) MC = AC (d) AC = AFC
12. Given that TC = TFC + TVC and TR = AR x Q, benefit is equivalent to (a) (AR + Q) – TFC (b) $\frac{(TFC+TVC)}{Q}$ **(c) (AR x Q) – TC** (d) $\frac{(TC \times Q)}{AR}$
13. Rent and regulatory costs are examples of (a) fixed costs **(b) variable costs** (c) average fixed costs (d) average variable costs

Contact 2

Topic: **Theory of Costs and Revenue**
Subtopic: **Relationship between VC, MC, AVC, AFC and AFC, Concept of Explicit and Implicit cost, Opportunity costs and Money cost**
Class: **S.S. 2**
Duration: **40 minutes**

Performance Objectives

Toward the finish of the illustration, the students ought to have the option to:

a. Explain various relation that exist among costs
b. Explain the concept of explicit and implicit costs
c. Differentiate between opportunity cost and money cost

RELATIONSHIP BETWEEN VC, MC, AVC, ATC AND AFC

(1) The negligible expense bend reduces the typical expense bend from underneath at its absolute bottom
(2) The nature of the negligible and normal expense bends shows that as the degree of result increments, the two costs diminishes to a limited extent.
(3) When the normal expense is falling, the negligible expense is underneath it while the typical expense begins rising.
(4) The negligible expense will cross the base mark of normal complete expense prior to rising.
(5) The normal fixed cost bend falls as result increments in light of the fact that the proper expense is spread over a bigger result level. The relationship among these expenses is addressed by the outline in Fig. 23.8 beneath.

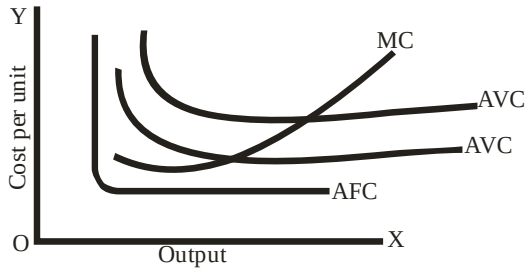


Fig 23.8: Cost curves of a firm

- **CONCEPTS OF EXPLICIT AND IMPLICIT COSTS**

Unequivocal expenses are installment that are made for assets bought from outside. At the end of the day, it alludes to all installments made clearly for the materials used all through creation.These costs incorporate direct money paid for transportation, pay rates, unrefined components, ad, and so on.

Verifiable expenses: Implied costs allude to the expenses of the assets provided by the proprietors for example proprietors of administrative abilities, monetary assets and proprietor involved structures. That is, understood cost alludes to the expense which owner of the firm clearly achieves on factors of creation, for instance the monetary sponsor's pay, standard advantage and other individual expenses. Because of the contribution of some open door cost components, these expenses are typically delegated implied.

- **OPPORTUNITY COST AND MONEY COST**

Opportunity cost, additionally alluded to as genuine expense or genuine expense, by definition is the labor and products sworn off by utilizing the assets in their best or most beneficial elective purposes. It just means an outpouring of cost similar to stayed away from different choices. As such, opportunity cost is the satisfaction of one need to the weakness of another need. It implies the necessities that are given unsatisfied to satisfy another truly pressing need.

Cash cost then again implies the proportion of money spent to make a particular respectable or organization. It can likewise be portrayed as the money worth of a thing. It is the cost similarly as real fragile (cash) regard. For instance, a rancher has N100 and has two squeezing needs, in particular to purchase a cutlass and a cultivator, every one of which costs N100. The rancher needs to decide to get one of the things to the detriment of the other because of his restricted accessible assets. Assuming the rancher chooses to purchase the cutlass and swear off the cultivator, N100 is in this manner the cash cost of the cutlass he purchased while the open door cost of the cutlass is the digger which he neglected to purchase with a similar measure of cash.

In this manner, the open door cost of any thing is alluded to as the option sworn off to purchase a thing while cash cost is the veritable proportion of money spent in buying such thing.

Practicing Exercises

1. Advantage fee is a term that portrays (a) the secret expense of setting up an undertaking (b) fee of one item as far as inevitable creation of others (c) what could be compared to the utility of a ware (d) costs identified with an ideal degree of creation (e) certain expenses
2. Opportunity expense is the (a) cost of scant merchandise (b) assets needed for making an item (c) cost of extravagance products (d) accumulation of monetary misfortunes by some coincidence (e) elective that is renounced to fulfil a need
3. Opportunity expense is best characterized as (a) the punishment for not taking advantage of brilliant lucky breaks (b) forfeited other option (yield, pay, and so on) (c) the expense of setting out work open doors (d) instalment made to a modern specialist (e) the distinction among fixed and variable expense
4. In the hypothesis of creation and cost, the normal absolute expense of a firm is limited when the minor expense bend reduces the normal all out expense bend at its (a) absolute bottom (b) centre point (c) greatest point (d) descending slopping segment
5. The freedom cost of the utilization of useful assets which a maker possesses thus doesn't pay for establishes (a) a decent expense (b) a certain expense (c) a variable expense (d) a superb expense
6. An organization's consumption on crude materials is viewed as (a) express expense (b) verifiable expense (c) prime expense (d) normal expense
7. At any given degree of yield, the absolute expense of a firm equivalents the (a) minimal expense in addition to the normal expense (b) fixed costs less its variable expense (c) normal expense duplicated by its yield (d) financial expenses increased by factor costs

Contact 3

Topic: **Theory of Costs and Revenue**

Subtopic: **Short-run and long-run costs and Distinction between Economist's and Accountant's views of Cost**

Class: **S.S. 2**

Duration: **40 minutes**

Performance Objectives

At the end of the lesson, the students should be able to:

a. Distinguish between short-run and long-run costs
b. Distinguish between economist's and accountant's views of cost

- **Short-Run and Long-Run Costs**

Short-run cost: The short-run cost might be characterized as that time period where a piece of the organization's helpful parts like construction, capital, stuff and costs are

fixed and some are variable. It is a period of time wherein certain hardware, assets and commitments of the firm are fixed right now not long enough for the firm to change its yield as a result of interest by enlisting pretty much element factors of creation like work and unrefined materials. To be in progress during the hour of short-run, the firm ought to have the choice to deal with its variable costs. If the expense of the thing is practically identical to the minor cost, it will incite low advantage with the exception of assuming its generally expected variable cost is covered. Any expense under the typical variable cost, the firm will really need to deal with its appropriate costs. It is recommended that when an organization's ordinary cost is more essential than its worth, the expense is more noticeable than AVC. Such firm should shut down for a really long time. This is because any further creation will add to hardships for a really long time.

Long-run cost: The time period over which all input creation measures are variable is the long-term cost. While the short-run decisions deal with the movement of existing proficiency limit, since quite some time ago run is an orchestrating period towards which a business visionary makes his game-plans and picks the plant size that is best for his errands.

- **Distinction Between Accountant's and Economist's Views on Cost**

The economist's view of cost is quite different from the way an accountant view it. The economist views cost in terms of opportunity cost, that is, the forgone alternative, namely how an individual can sacrifice one thing in order to obtain another. The money spent on a commodity is not what bothers the economist but the alternative commodity that is left un-bought in order to purchase that commodity.

On the other hand, the accountant views cost in terms of the amount of money spent in order to have a commodity. In other words, the accountant view cost in terms of actual payment made, which is referred to in Economics as money cost.

In summary, an economist views cost in terms of opportunity cost, while an accountant views cost in terms of actual money spent.

Practicing Exercises

1. The close down point for a firm in the short-run is the yield at that (a) the cost of the thing is by and large diminished (b) minor expense is reliable (c) regular variable expense isn't covered (d) common expense is least
2. In the since a really long time back run a firm will leave an industry if respect (a) doesn't cover basically Normal All out Cost (b) isn't comparable to Peripheral Expense (c) is higher than Normal Variable Expense (d) isn't essentially identical to the foundation of the Minimal Expense twist
3. The U-condition of the since a long time back run typical cost curve can be explained by the (a) law of growing returns (b) law of consistent returns (c) hypothesis of unavoidable misfortunes (d) thoughts of economies and diseconomies of scale

4.

Quantity of Singlet	Short-run total costs (₦)
0	1,000
10	1,200
20	1,400
30	1,600
40	1,800

The short-run complete expenses for various degrees of yield for a firm creating singlets are displayed previously. Compute the variable expense per unit at a yield of 20 (a) N1,000 (b) N400 (c) N70 (d) N20

5. In the since a long time ago run, all creation factors are (a) fixed (b) semi-fixed (c) variable (d) semi-variable

6. The fundamental connection between the expense of creation and the market cost of any item in the short run is that the market value (a) consistently mirrors the expense of work (b) mirrors the variable, however not the proper expense of creation (c) doesn't transcend variable expense (d) is dictated by the expense of creation and the current pace of swelling

7. The sort of cost which must be covered for a firm to proceed with creation in the short-run is the (a) overhead expense (b) fixed expense (c) peripheral expense (d) normal variable expense

8. The short-run balance in a completely aggressive business sectors requires that (a) negligible expense be equivalent to add up to income (b) minor expense and peripheral income be equivalent (c) costs are commonly dictated by purchasers and dealers (d) the minimal expense bend reduces the absolute expense bend

9. The since quite a while ago run normal expense bend is known as an arranging bend since it shows what ends up costing when (a) a greater size of plant is fabricated (b) various sizes of plants are constructed (c) variable sources of info are expanded (d) fixed components are expanded

10. Long run creation is known as (a) consistent losses to gauge (b) returns to gauge (c) outside financial prudence of gauge (d) financial prudence of gauge

11. For an industry to make back the hidden hypothesis after some time, the inconsequential expense bend should cut the (a) normal variable expense wind at its most fundamental point (b) run of the mill cost contort at any two-through and through base (c) immovable cost curve at its by and large base (d) regular expense turn at its inside and out base

12. A rising short-run common expense is an aftereffect of (a) economies of scale (b) falling minor expenses (c) unavoidable disasters (d) rising fixed expenses

13. If the short run cost spot of a firm is U-outlined, the outskirts and ordinary costs are identical where the (a) typical variable cost is least (b) immaterial cost is falling (c) standard cost is least (d) standard fixed cost is falling

14. The since a really extensive time frame back run normal cost breeze contacts to the short-run normal cost turns at the (a) base spots of all short-run typical cost turns (b) declining points of all short-run traditional cost turns (c) least characteristic of only one of the short-run cost reshape (d) rising signs of all short-run standard cost turns

15. The short-run period in progress is depicted as a period when (a) there is something like one fixed part (b) all expenses of creation should be covered (b) the yield can't be changed (c) current yield isn't helpful

16. The ideal degree of yield for a totally awful firm is the place where (a) constrained air framework is by and large immaterial (b) AVC is least (c) MC is rising (d) MC is falling

Contact 4

Topic: **Theory of Costs and Revenue**
Subtopic: **Cost of Production Schedule, and Mathematical Approach to Cost**
Class: **S.S. 2**
Duration: **40 minutes**

Performance Objective

Toward the finish of the example, the students ought to have the option to:

a. Calculate various cost of production

- **COST OF PRODUCTION SCHEDULE**

When arranged in a schedule known as the cost of production schedule, as shown in the table below, the cost concepts are easier to interpret and comprehend. Any absent figure(s) can be determined or topped off utilizing other expense values and their individual formulae

Unit of Output (TQ) N	Total Fixed Cost (TFC) N	Total variable Cost (TVC) N	Total Cost (TC) N	Average Total Cost (ATC) N	Average Variable cost (AVC) N	Average fixed cost (AFC) N	Marginal cost (MC) N
1	20	12	32	32	12	20	-
2	20	14	34	17	7	10	2
3	20	16	36	12	5.3	6.6	2
4	20	18	38	9.5	4.5	5	2
5	20	20	40	8	4	4	4
6	20	22	42	7	3.6	3.3	2
7	20	24	44	6.3	3.4	2.8	2

Table 1: Cost schedule of a firm

- **MATHEMATICAL APPROACH TO COSTS**

You are required to complete the table below. Using the various cost concept formulas

to solve them is one way to accomplish this.

Example 1

Complete the accompanying expense timetables and answer the inquiries that follow.

Output (Q)	Total Cost (TC)	Average cost (AC)	Marginal Cost (MC)
1	18	8	-
2	14	?	?
3	?	6	?
4	20	?	?
5	?	6	?
6	48	?	?

(a) At what result is AC at the base?
(b) At what result is MC at the base?
(c) At how result treats begin expanding?
(d) At how result treats begin to be more noteworthy than AC?
(e) What is the greatest result? (SSCE August, 1991)

Solution

Output (Q)	Total Cost (TC)	Average cost (AC)	Marginal Cost (MC)
1	18	8	-
2	14	c	f
3	a	6	g
4	20	d	h
5	b	6	i
6	48	e	j

TC = AC x output

a = output 3

TC = AC x output = 6 x 3

TC = 18

b = TC = 6 x 5

TC = 30

c = AC = $\frac{TC}{Output} = \frac{14}{12} = 1.16$

d = AC = $\frac{20}{4} = 5$

f = MC at output 2

TC 2 – TC = 14 – 18 = 6

g = MC at output 3 = 18 – 14 = 4

h = MC at output 4 = 20 – 18 = 2

i = MC at output 5 = 30 – 20 = 10

j = MC at output 6 = 48 – 30 = 18

(a) Output 4 units

(b) Output 4 units

(c) Output 5 units

(d) Output 5 units

(e) Maximum output is 6 units

Example

Cost schedule of a firm

Output (Q) N	**Total Fixed Cost (TFC) N**	**Total variable Cost (TVC) N**	**Total Cost (TC) N**	**Average Variable cost (AVC) N**	**Average Total (ATC) N**	**Marginal cost (MC) N**
0	100	0	100	0	100	-
1	100	40	140	?	?	?
2	100	64	164	?	?	?
3	100	80	180	?	?	?
4	100	88	188	?	?	?
5	100	96	196	?	?	?

From the expense plan in180 the table above, work out the normal variable expense (AVC), normal all out cost (ATC) and 3 peripheral expense (MC) of the firm. Show your working plainly (SSCE June, 1993).

Solution

Output (Q)	**TFC**	**TVC**	**TC**	**AVC**	**ATC**	**MC**
0	100	0	100	0	100	-
1	100	40	140	40	140	40
2	100	64	164	32	82	24
3	100	80	180	27	60	16
4	100	88	188	22	47	8
5	100	96	196	19.2	39.2	8

(a) AVC = $\frac{TVC}{Q}$ = $\frac{40}{1}$ = 40

= $\frac{64}{2}$ = 32

= $\frac{80}{3}$ = 27

= $\frac{88}{4}$ = 22

= $\frac{96}{5}$ = 19.2

(b) ATC = $\frac{TC}{\Delta Q}$ = $\frac{140}{1}$ = 140

= $\frac{164}{2}$ = 82

$= \frac{180}{3} = 60$

$= \frac{188}{4} = 47$

$= \frac{196}{5} = 39.2$

(c) MC = $\frac{\Delta TC}{\Delta Q}$ = 140 - 100 = 40

= 164 - 140 = 24

= 188 - 180 = 8

= 196 - 188 = 8

Practicing Exercises

1.

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

In the above table, the minor expense of the third item of result is (a) **10** (b) 6 **(c)** 12 (d) 2 (e) 9

2.

Quantity	**Fixed Cost ₦**	**Variable Cost ₦**	**Total Cost ₦**	**Marginal Cost ₦**	**Average Cost ₦**
1	750	200	950	-	950
2	750	560	1310	360	655
3	750	900	1650	?	550

The above table shows the short run expenses of a firm. What is the company's minimal expense for the third thing created? (a) N350.00 (b) N340.00 (c) N360.00 (d) N370.00 (e) N505.00

3.

Output	**Total Costs (₦)**
1	20
2	56
3	96
4	144
5	160

In the table over, the negligible expense when result is two units is, (a) N16.00 (b) N20.00 (c) N26.00 (d) N40.00 (e) N48.00.

4.

Q (tons)	60	70	80	90	100
TC (₦)	680	870	840	960	1100

MC (₦/ton)		10	6	12	14

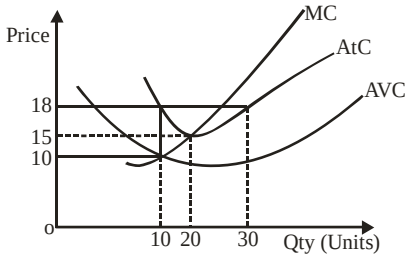
Consider the table above showing yield (Q), all out cost (TC) of creation and peripheral expense (MC) for a firm in a cutthroat market. Assume value (P) = N12, what is the most extreme benefit the firm can make? (a) N2,000.00 (b) N1,200.00 (c) N1,000.00 (d) N400.00

5.

Units of variable input	Total output	Total fixed cost	Total variable cost
0	0	100	0
1	3	100	100
2	8	100	124
3	16	100	172
4	20	100	190
5	22	100	200

Calculate the marginal physical product of the unit (a) 0 **(b) 2** (c) 4 (d) 10

To respond to questions 6 and 7, use the diagram below.



6. The normal absolute expense when 2.0 units are delivered is (a) N20.00 (b) N13.00 (c) N23.00 (d) N15.00

7. When 2.0 units of result is created TC will be (a) N360 (b) N300 (c) N460 (d) N400

8. Given that FC = N500, VC = N1500, and Q = 50 units. Track down the normal expense of the item (a) N10 (b) N20 (c) N30 (d) N40

Utilize the table underneath to respond to questions 9 and 10

Output produced per day (Units)	Fixed cost per day (₦)	Total cost per day (₦)
2	6	10
3	6	12
4	6	13
5	6	13.5
6	6	15
7	6	17
8	6	19

9. At 60 units of output, the AVC is (a) ₦2.50 **(b) ₦0.15** (c) ₦90 (d) ₦150

10. The ATC at 30 units of output is (a) ₦3.00 **(b) ₦4.00** (c) ₦60.00 (d) ₦120.00

Contact 5

Topic: **Theory of Costs and Revenue**

Subtopic: **Revenue Concepts, Relationship between Average Revenue and Marginal Revenue and Profit**

Class: **S.S. 2**

Duration: **40 minutes**

Performance Objective

At the end of the lesson, the students should be able to:

a. Define revenue
b. Distinguish between the different revenue concepts (total, average, marginal)
c. Draw different revenue curves.
d. Explain the relationship between revenue and production.

- **MEANING OF REVENUE AND PROFIT**

Definition: Revenue may be defined as all the money income accruing to a firm from the sale of goods and services, assets or investment.

Definition: The profit of a firm is defined as the difference between the total revenue and total cost. It is expressed mathematically as:

Profit = TR – TC where

TR = Total Revenue

TC = Total Cost

The profits earned by a firm depend on the relationship between its cost and revenue. If the firm's total revenue exceeds its total cost, the firm makes **profit** but when its total cost exceeds its total revenue, the form makes **losses**.

Just as the firm incurs different kinds of costs in its production activities, so also does it obtain different kinds of revenues from its sales activities.

- **TYPES OF REVENUE**

Three main types of revenue can be distinguished in economics. These are:

1. Total revenue
2. Average revenue, and
3. Marginal revenue

Total revenue

Total revenue (TR) is the total amount of income generated from the sale of a firm's products. It is represented by a formula TR = Price x Quantity sold or AR x Quantity sold. It is directly dependent on the quantity of goods sold, so that the higher the quantity sold, the higher the total revenue. Mathematically, the total revenue is the product of the quantity of the commodity sold and the selling price per unit. For example, if a firm sells 60 unit of a commodity at a selling price of N40 each then the

total revenue = 60 x ₦40 = ₦2,400.00

Diagrammatically, the total revenue curve is shown in Fig. 24.1

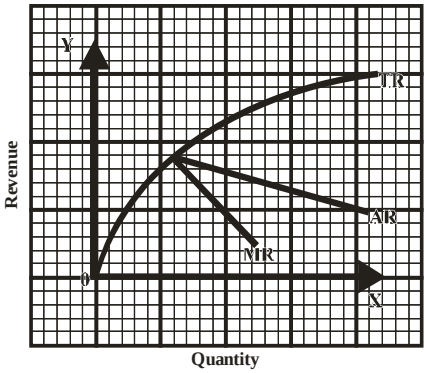


Fig 24.1: Revenue Curves of a Firm

Average revenue

Average revenue (AR) is the revenue per unit of product sold. It is also equal to the price of the firm's product. It represented by a formula:

AR = $\frac{TR}{O}$ or AR = P

It is obtained by dividing total revenue from a given number of units sold by that number of units. In the short run, the average revenue may be inversely related to the quantity sold. Thus, the average revenue may fall as the quantity sold increases. This is shown diagrammatically in Fig 24.2.

Marginal Revenue

Marginal Revenue (MR) is the addition of total revenue as an additional unit of the product is sold. It is represented by a formula:

MR = $\frac{TR}{\Delta Q}$ OR $\frac{TR_2}{Q_2}$ - $\frac{TR_1}{Q_1}$

It is the adjustment of absolute income because of selling one more unit of an item. For instance, if absolute income is N90 from the deals of 9 units and N95 from the offer of 10 units, the minor income from the tenth unit sold is N95 – N90 = N5. In the short-run, the negligible income might fall as the amount sold increments. The minimal income bend delineated in Fig. 24.2

- **RELATIONSHIP BETWEEN AVERAGE REVENUE AND MARGINAL REVENUE**

The connection between the peripheral income and the normal income of a firm in the short-run is that both may fall as the quantity sold increments, yet the minor income falls quicker than the normal revenue. This evident in Fig. 24.2

Worked Example

Concentrate on the chart beneath cautiously and utilize the offered data to response the questions that follow:

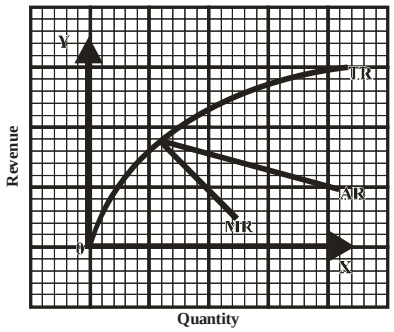


Fig. 24.3: Marginal Revenue Cost

(a) Determine:
   a. the profit maximizing output;
   b. the firm's profit if it produces 600 units of output
   c. the total cost if the firm produces 400 units

(b) Calculate the

(i) total revenue

(ii) profit of the firm at the output level of 900 units

(c) What will happen if a firm's market price falls below its average variable cost?

Solution

(a)(i) Profit-maximizing output level is 900 because at this output level MC = MR

(ii) TR = \$10 x 600 = \$6,000
TC = \$6 x 600 = \$3,600
Profit = TR – TC = \$2,400

(iii) TC = P x Q
\$10 x 400 = \$4,000

(b)(i) TR = P x Q
= \$10 x 900 = \$9000

(ii) At 900 units TR – TC, TC
= \$8 x 900 = \$7,200
Profit = \$9,000 - \$7,200
= \$1,800

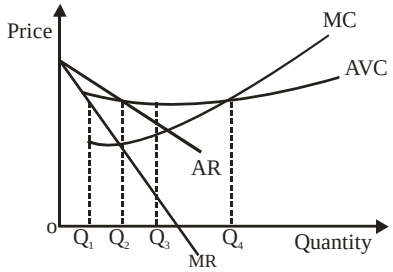
(c) At any time, price (AR) is below the average variable cost, TR will be less than TVC and operating profit will be negative, that is, there will be loss on operation. The firm will eventually close down.

Practicing Exercises

1. When minor expense approaches negligible income item (a) the firm is creating confused (b) the firm is at a make back the initial investment point (c) the firm is attaining the minimum advantage (d) reinforcing fee of the establishment is by and large vital (e) the firm has most noteworthy advantage
2. If an industry duplicates its yield and its costs upsurge by 60%, the industry is undergoing (a) extending costs (b) financial prudence of scale (c) unavoidable losses (d) reducing costs (e) nothing founded on what was as of late referenced

3. Full agreement under awesome challenge involves that (a) MC = MR and AC = AR (b) MC = MR yet AR > AC (c) MR = MC = AR = AC (d) TR > TC (e) MR = MC
4. Under astounding contention, the since a surprisingly long time prior run balance requires (a) MR = MC (b) MR = AC = AR (c) MR > MC (d) MR = MC = AR = AC (e) AR = AC
5. An industry is at its optimal capacity when (a) it conveys the best yield at the base cost (b) it has a point of view to grow yield (c) immaterial cost ascends to fringe pay (d) minor cost isn't actually insignificant payThe yield at which all out income rises to add up to cost is known as (a) benefit boosting yield

Q (ton)	4	5	6	7	8	9	10
TC (₦)	160	180	198	210	240	315	400
TR (₦)	200	225	240	245	250	180	150

   he table above gives the various levels of yield (Q) and it relating all out cost of creation (TC) and all out income (TR) for a firm. Which yield level Q brings about greatest benefit? (a) 4 (b) 5 (c) 6 (d) 7
6. A firm with minor expense equivalent to its negligible income will deliver the harmony yield in case it is in (a) unadulterated contest in particular (b) unadulterated imposing business model just (c) monopolistic rivalry just (d) any sort of market
7. If benefit augmentation is thought to be the target of a commercialendeavor, work should be paid a pay frequency equivalent to the (a) minor income of the venture (b) peripheral income result of work in the undertaking (c) normal income result of work in the venture (d) minimal expense of creation
8. 

   The outline above addresses the short run position of a monopolist. The benefit boosting yield is (a) Q3 (b) Q4 (c) Q1 (d) Q2
9. In request to expand income, the merchant of a product whose request is genuinely flexible is encouraged to (a) increment value (b) diminish yield (c) decrease value (d) hold cost
10. A wonderful contender will keep on extending yield up to where (a) MC<MR (b) MC>MR (c) TC>TR (d) MR=AR

11.

Quantity of Commodity sold	Total Revenue from sales of commodity
43	N228.00
44	N233.00
45	N238.00

The firm whose deals and absolute income of the item as given above is (a) a monopolist (b) a monopolistic contender (c) an ideal contender (d) an oligopolist

12. At where, negligible income of a monopolist is equivalent to nothing, its all-out income will be (a) falling (b) rising (c) equivalent to nothing (d) greatest

Utilize the table underneath to respond to questions 16 and 17

Yield in Units	Total Revenue in N	Average Revenue in N	Marginal Revenue in N
1	2.0	2.0	-
2	3.8	1.9	1.8
3	5.4	-	1.6
4	6.8	-	-
5	8.0	1.6	-

13. Given a yield of 3 items, the typical pay is (a) N1.60 (b) N1.80 (c) N2.00 (d) N2.40
14. Regulate the fringe pay if the full scale pay is N8.00 (a) N1.20 (b) N1.40 (c) N1.60 (d) N1.80
15. A firm chooses its advantages when it thinks about it (a) Minor cost (b) Normal cost (c) Absolute Expense (d) Normal cost similar with cost watching out
16. Both in the short run and as time goes on, a firm increases its advantages when (a) MC = MR (b) AC = MC (c) AVC = AC (d) MC = AVC
17. If an increment in the cost of a product prompts expansion in all out income, then, at that point it suggests that the interest for this thing is (a) common (b) flexible (c) inelastic (d) strange

Contact 6

Topic: **Taxation**

Subtopic: **Meaning, Features and Principles of good tax system**

Class: **S.S. 2**

Duration: **40 minutes**

Objectives

At the close of the lesson, the students ought to be able to:

a. Define taxation

b. Explain characteristics of tax
c. List and explain principles of good tax system

Presentation

➢ **Meaning of Taxation:**

Taxation is the act or technique for forcing an obligatory toll by the public authority or its organization on people and firms, or on labour and products. Duty, then again, can be portrayed as a necessary toll forced by the public authority or its organization on people and firms or on labour and products.

➢ **Features of tax**

The following characteristics of tax can be found:

a. The tax is imposed by the government of its agency.
b. There is compulsory levy on all individuals and firms or on goods and service.
c. The imposed levy is meant for the provision of social/public utility.
d. The imposed levy is a sacrifice on the part of those that are paying them.
e. Although this feature is not found in the illustration, tax payment has age limit. A minor cannot pay tax since he is less than 18years old.

➢ **Principles of good tax system:**

According to Adam Smith there are certain principles of a good tax system, otherwise known as canons of good tax system. These include:

1. **Equity or ability to pay**: this implies that tax revenue should be raised without causing undue hardship to the tax payer.
2. **Economy:** the guideline expresses that the expense of assessment assortment ought to be modest comparative with the income yield.
3. **Convenience:** a tax should be convenient as to form, time and place of payment. For example, an import duty should be duly paid as the imported goods arrive the country.
4. **Certainty**: the tax should be certain and clear to everyone concerned.
5. **Revenue yield**: Government should be comfortable with taxes that will provide a fairly predictable and steady income.
6. **Neutrality**: A good tax should not interfere unnecessary with the supply and demand for goods and services.
7. **Benefits-receive principle**: Tax payers should benefit from government supplied goods or services financed with income from tax collected.
8. **Flexibility**: the tax system should be flexible enough for adjustments when the need arises.
9. **Simplicity:** A tax system should not be difficult to administer and understand. It should not cause problems of differences in interpretation.

Class Practice Exercise:

1. Taxation is the act or technique for (a) forcing a mandatory toll by the public authority or its office on people and firms, or on labour and products (b)

2. The following are the characteristics of tax except (a) levied by the government or its agencies (b) for the provision of social/public utility (c) a sacrifice on the part of those that are paying them (d) paid by less than 18 years old.
3. Compulsory levy on all individuals and firms or on goods and service is a feature example of (a) incidence of taxation (b) system of taxation (c) characteristics of tax (d) effect of taxation
4. Describe tax (a) as a necessary duty forced by the public authority or its organization on people and firms or on labour and products (b) is a public collection of undefined money from members of the public (c) is a term of stating the duty of government in collecting grants from international donors (d) is the expression of wish without action.
5. Who put forth the principles of good tax system? (a) Alfred Marshal (b) Lionel Robinson (c) Adam Smith (d) John Stuart.
6. When assessment framework put into thought what expense means for creation, investment funds and individuals' ability to work. This is (a) principle of consideration (b) principle of neutrality (c) Principle of flexibility (d) principle of simplicity.
7. Which of the principles has been negated when the cost of collecting tax is high (a) equity (b) economy (c) benefit-receive (d) certainty.
8. The kind of principle of taxation that gives room for adjustment when need arises is (a) flexibility (b) convenience (c) revenue yield (d) neutrality
9. In tax collection, the advantage rule requires that (a) everyone should draw profits by tax collection (b) every one of the individuals who procure more pay should cover more charges (c) just the individuals who get advantage from administrations gave from public income ought to be burdened (d) charges paid by organizations ought to be moved to those purchasers profiting with such customer wares (e) everyone pays an equivalent sum

Contact 7

Topic: **Taxation**

Subtopic: **Reasons for Government imposition of taxes and Economic effects of taxation**

Class: **S.S. 2**

Duration: **40 minutes**

Objectives

Toward the finish of the exercise, students ought to have the option to:

i. Explain reasons for imposing taxes; and
ii. List and discuss the economic effects of taxation

Presentation

- **Reasons for Government imposition of taxes**

Reasons for imposing tax include:

a. To raise revenue
b. To redistribute income
c. Discouragement of production and consumption of harmful goods
d. To control inflation
e. To protect infant industries
f. To correct an adverse balance of payment
g. Prevention of dumping
h. Direction of production and investment
i. Promotion of economic growth
j. Retaliatory measure
k. Employment purposes
l. savings

- **Economic effects of taxation**

Tax imposition can be feet on the following:

1. production
2. inflation
3. consumption/investment
4. prices of goods and services
5. salaries of workers
6. demand and supply
7. savings

Class Practice Exercise:

1. Among various reasons of imposing tax are these except for (a) promoting economic growth (b) prevention of dumping (c) controlling inflation (d) leading money to commercial banks
2. Protecting infants' industries against foreign competitors is one of the reasons for imposing tax. Why? (a) so as to help them grow and develop to face challenges in the international markets (b) so that their fathers will keep them (c) so that they will help government secure foreign loans (d) all of the above.
3. The weight of an administration charge on a product whose solicitation is inflexible will (a) be shouldered only by the public power (b) fall all the more intensely on customers (c) be shared similarly among shopper and makers (d) fall all the more vigorously on makers.
4. The more noteworthy weight of the expenses on fundamental products is borne by the (a) centre pay bunch (b) major league salary bunch (c) low pay bunch (d) not many top rich individuals

Contact 8

Topic: **Taxation**

Subtopic: **Problems associated with tax collection and Incidence of taxation**

Class: **S.S. 2**
Duration: **40 minutes**

Objectives

Toward the finish of the example, the students ought to have the option to:

a. Describe confronting problems of collecting tax
b. Give meaning of incidence of taxation

Presentation

- **Problems related with tax collection**

Troubles are experienced by charge gatherers during the time spent collecting tax.

a. Failure to satisfy civic obligations
b. Failure to pronounce genuine pay
c. Failure to meet individual's expectation
d. Tax evasion
e. Insincerity of tax collectors
f. Lack of book of account
g. Wrong belief of the people
h. Mismanagement of government fund

- **Incidence of taxation**

Incidence of taxation refers to the point at which the tax burden finally rests. The burden here refers to the amount paid as tax. The incidence or burden therefore lies on the person who finally pays the tax.

Types of incidence of taxation

1. Formal incidence
2. Effective incidence: makes references to who bear the final burden of taxation. With reference to direct taxes, the payer bears the full (initial and final) burden of taxation. In the case of indirect taxes, the consumer, the seller, or both parties may share the burden of taxation. The elasticity of demand for the taxed commodity will determine the extent to which either or both of them bear the burden of taxation.
    a. frequency of roundabout expense when request is totally inelastic
    b. incidence of roundabout assessment when request is totally flexible
    c. incidence of roundabout assessment when request is reasonably flexible or modestly inelastic
    d. incidence of indirect tax when demand is unitary

Class Practice Exercise:

1. Governments of West African countries levy taxes to (a) prevent prices from falling (b) make people richer (c) limit the number of banks (d) finance government projects.

2. A major use of taxation is to (a) control population growth rate (b) influence people's spending habits (c) control money supply (d) create bank credits.
3. Tax evasion in Economics means (a) false declaration of assets (b) paying tax only as and when due (c) declaration of assets (d) quarrelling with tax collector.
4. A more noteworthy weight of the charges on fundamental items is borne by the (a) lower pay bundle (b) more significant salary bunch (c) contractors (d) recently enrolled laborers
5. When governments need to debilitate utilization, they charge products whose request is (a) cost inelastic (b) strange in nature (c) value flexible (d) typical in nature.
6. The weight of an administration charge on an item whose request is inflexible will (a) be shouldered simply by the public authority (b) fall all the more vigorously on customers (c) be shared similarly among purchaser and makers (d) fall all the more intensely on makers
7. A government that needs to get more income will build the expense on items with (a) excessive cost versatility of interest (b) low value flexibility of interest (c) big league salary versatility of interest (d) low pay versatility of interest.
8. Government income will increment in case burdens are required on products with (a) totally versatile interest (b) genuinely flexible interest (c) entirely inelastic interest (d) unitary flexible interest.
9. Who bears the more noteworthy weight of backhanded expense when the interest for a ware is inelastic? The (a) distributer (b) investor (c) retailer (d) shopper

Contact 9
Topic: **Taxation**
Subtopic: **Types of tax and Systems of taxation**
Class: **S.S. 2**
Duration: **40 minutes**

Objectives
At the end of the lesson, the students should be able to:
a. List and explain two types of taxation
b. List and explain systems of taxation

Presentation
➢ **Types of tax**
There are two major types of tax. These are direct and indirect tax.
- Direct Tax: alludes to the sort of assessment forced straightforwardly on pay of people or associations by the public authority or its organization.Such would incorporate wages, pay rates, benefits, leases and interests. The burden of such tax is borne by the payers. The tax payers are generally mindful of the installment of such expense..

Types of Direct Tax:

a. Personal income tax
b. Company tax
c. Pool tax
d. Capital tax
e. Capital gains tax
f. Expenditure tax

Advantages of Direct tax

1. They are progressive in nature
2. They are non-inflationary
3. Reduce inequality of income
4. Easy estimation of revenue
5. Certainty in tax liability
6. They are cheap to collect
7. They are convenient to payers

Disadvantages of Direct Taxes

a. They reduce savings
b. They discourage investment
c. They are prone to evasion
d. They are inconvenient
e. Disincentive to hard work
f. They reduce purchasing power
g. Difficulties in proper assessment

Indirect Taxes

Indirect taxalludes to charges which are forced of demanded on labour and products unimaginably. The maker or merchants bear the underlying weight prior to moving them to the last shoppers in type of more exorbitant costs. The citizens under aberrant expense are normally not mindful of the measure of duty being paid.

Types of indirect tax

a. Custom duties- import and export duties
b. Excise duties
c. Sales tax
d. Purchase tax
e. Value added tax (VAT)

Classification of indirect tax

a. Ad valorem tax: this is a structure charge circuitous duty forced on items as per their particular rates. Extravagance merchandise draw in high level of duty than fundamental products.
b. Specific tax: in this type of circuitous assessment, a decent aggregate is forced or demanded per unit of an item, independent of its worth, for example equivalent level of duty is collected on both extravagance and fundamental wares.

Advantages of Indirect tax

1. Source of government revenue
2. Less burden of tax
3. Protection of infant industries
4. To correct balance of payment deficit
5. To check importation of harmful commodities
6. to control harmful goods' production and consumption
7. Easy and cheap to collect
8. Prevention of dumping
9. It bridges the wealth-to-poverty divide.
10. They are not easy evade
11. It leads to less squabbles.

Disadvantages of Indirect tax

a. They are regressive
b. High cost of collection
c. They are inflationary in nature
d. It could lead to industrial unrest
e. Difficulties in its determination
f. Uncertainty in revenue generation
g. It discourages investment
h. It increases prices of commodities.

Systems of taxation

Taxation, especially direct tax, can be classified according to the following systems. These are:

1. Progressive tax: this type of taxation in which the rate of assessment rises with taxable income, wealth, or property value. People with higher incomes pay more taxes than people with lower incomes do. An excellent illustration of this tax is Pay As You Earn.
2. Proportional tax: This is a sort of expense wherein the pace of assessment is the equivalent independent of the degree of Income or wealth.
3. Regressive tax: This is tax system where the tax rate decreases as income increases. In this case, the higher the income of a consumer, the lower the rate of tax. In regressive tax, a poor person pays a higher proportion of tax than a rich person. A good example of regressive tax is poll tax.

Class Practice Exercise:

1. Indirect charges are charges which (a) are gathered on the wages and advantages of persons and organisations (b) reliably effect the creator just (c) rely upon reformist guidelines (d) are needed on work and items purchased by individuals and firms.
2. An advertisement valorem charge is forced on (a) uncommon wares (b) trades (c) imports (d) the worth of a product

3. Which of coming up next is a backhanded assessment? (a) Income charge (b) organization charge (c) benefit charge (d) deals charge.
4. A expense collected on labor and products at apiece phase of creation is (a) surcharge (b) VAT (c) Ad valorem (d) PAYE
5. An promotion valorem charge alludes to an assessment (a) forced on sends out (b) on merchandise makes in the nation (c) in light of the worth of the product (d) required on pay.
6. Regressive expense is certainly not a decent assessment framework since it (a) isn't advantageous to pay (b) isn't sure what to pay (c) isn't prudent to gather (d) doesn't guarantee value in installment.
7. Proportional expense is an assessment whose (a) rate stays consistent as the duty base expands (b) rate increments as the assessment base increment (c) rate diminishes as the duty base builds (d) rate changes as the expense base increments.
8. A expense whose rate increments as pay increments is (a) a circuitous assessment (b) a reformist duty (c) a backward assessment (d) a corresponding duty.
9. If expense takes a bigger extent of the pay of individuals with lower pay, the assessment is (a) reformist (b) corresponding (c) backward (d) advertisement valorem.
10. All roundabout charges will in general be (a) reformist (b) backward (c) certain (d) impartial

APPENDIX VII

THE INTERNATIONAL CENTRE FOR EDUCATIONAL EVALUATION (ICEE)
INSTITUTE OF EDUCATION,
UNIVERSITY OF IBADAN

TUTOR'S MANUAL FOR

ENHANCED-DECLARATIVE KNOWLEDGE APPROACH

Contact 1

Topic: **Theory of Costs and Revenue**
Subtopic: **Definition of cost of production and basic cost concepts and Relationship between total, average and Marginal costs**
Class: **S.S. 2**
Period: **40 mins**

Performance Purposes

Toward the finish of the example, the students ought to have the option to:

d. define cost of production
e. list and explain basic cost concepts
f. identify the relationship between Total, Average and Marginal cost

- **Definition of cost of production**

Best Choice Pharmaceutical Company has just purchased 5 hectares of land costing ₦5,000,000.00; imported raw materials from Turkey at worth of ₦15,000,000.00; employed 50 workers amounting to ₦2,000,000.00 and paid 2 management staff with ₦500,000.00. With this scene, define the cost of production.

Solution:

The following expenses were made by Best Choice Pharmaceutical Company:

Land (5 hectares)	=	₦5,000,000.00
Labour (50 workers)	=	₦2,000,000.00
Capital (raw materials)	=	₦15,000,000.00
Entrepreneur (2 management staff)	=	₦500,000.00
		₦22,500,000.00

This implies that for Best Choice Pharmaceutical Company to produce drugs, the company had expended on what is known as factor of production. Based on these expenses on the elements of creation, the expense of creation can be characterized as the amount of the expense of land, work, capital and business visionary utilized in the creation of medications by the Best Choice Pharmaceutical Company. As such, cost of creation is the costs caused in the utilization of elements of creation to deliver products and service.

- **BASIC COST CONCEPTS**

(1) Fixed Cost (FC): The term "fixed cost," also known as "overhead expense" or "unavoidable expense," refers to any costs that do not change regardless of the yield. It simply refers to the project's cost that does not change with the yield. Toward the day's end, fixed cost doesn't change with the advancing yield. Therefore, fixed costs remain constant regardless of product quantity. Fixed cost can be addressed by a diagram as displayed in Fig. 23.1. The cost of buildings, land, motor vehicles, and plant and machinery are all examples of fixed costs. This formula is used to calculate fixed costs:
FC = TC – VC
OR
TFC = AFC x Quantity produced

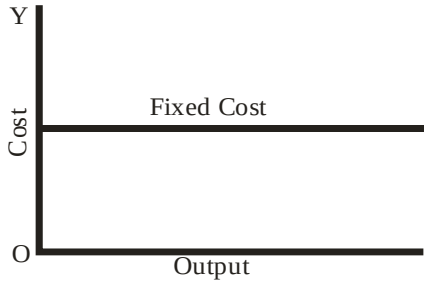


Fig 23.1: Fixed cost (FC)

(2) Variable cost (VC): The term "variable cost," also known as "direct expense," refers to the expense of production that is directly correlated with the level of outcome. Variable costs have a tendency to rise when more of a good is made and fall when less of it is made. Variable expense can be addressed by a chart as displayed in Fig. 23.2. Examples include labor and raw materials. This formula is used to calculate variable costs: VC = TC – FC

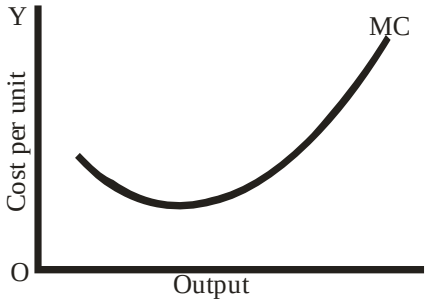


Fig 23.2: Variable cost (VC)

(3) Total Cost (TC): The sum of all the fixed and variable costs incurred during the production of a specific product can be referred to as total cost. The total cost, as shown in Fig. 23.3 consists of two parts: complete fixed cost (TFC) and all out factor cost (TVC). Complete expense can be determined with this equation: TC = FC + VC or TC = ATC x Q.

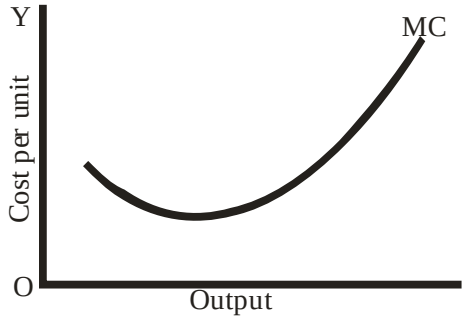


Fig 23.2: Variable cost (VC)

Total Costs: The table 1 below shows various costs incurred by Zenith Nigeria Company with level of outputs in the course of production in the year 2017.

Output	**Fixed Costs (₦)**	**Variable Costs (₦)**	**Total Costs (₦)**
0	100	0	100
10	100	120	220
20	100	200	300
30	100	260	360
40	100	300	400
50	100	320	420
60	100	340	440
70	100	400	500
80	100	480	580
90	100	580	680
100	100	720	820

Table 1, shows that when yield is zero, fixed expense is N100 and variable expense is N0, while all out cost is [FC(100+VC(0) =N100]. It uncovers that all out costs are the amount of fixed and variable expenses. At the point when yield increments to 80 units all out costs go up N580 (N100+N480). Figure 1 shows the connection between all out costs, fixed expenses and variable expenses. Complete expenses are the whole of fixed and variable expenses. At point O, yield is zero and variable expense is likewise zero however fixed expense N100, consequently all out costs is additionally N100. Absolute Cost and variable expense bends are corresponding to one another.

(4) Average cost (AC) or Average Total cost (ATC): Average cost is characterized as an expense for every unit of result or the all out cost of creation of an item brought about by an undertaking separated by the quantity of units of result. Average total cost (ATC) is divided into average fixed costs (AFC) and average variable costs (AVC).

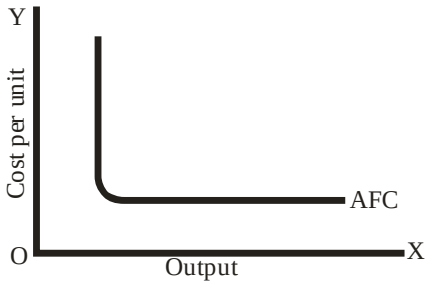


Fig 23.2: Average cost (AC)

Average cost (AC: is derived by dividing the total cost by the total number of output produced. Average cost, which is shown graphically in Figure. 23.4, is determined by this recipe:

$AC = \frac{Total\ Cost\ (TC)}{Total\ Output\ (TQ)}$

OR

ATC = AFC + AVC

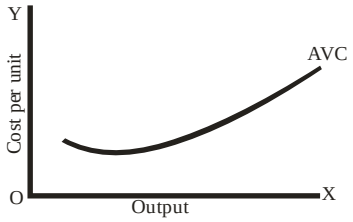


Fig 23.5: Average Variable Cost (AVC)

AC = TC/Q

AC = Average Cost

TC = Total Cost

Q = Quantity

The other method to calculate average cost is

AC = AFC + AVC

AC = Average Cost

AFC = Average Fixed Cost

AVC = Average Variable Cost

AFC = AC – AVC

AVC = AC – AFC

Table 2

Output	Total Costs (₦)	Average Costs (₦)
0	100	∞
10	220	22
20	300	15
30	360	12
40	400	10
50	420	8.4

60	440	7.3
70	500	7.1
80	580	7.2
90	680	7.5
100	820	8.2

Table 2 portrays that normal expense can be determined by partitioning complete expenses with yield. First and foremost normal expense is high and afterward it reducing. At unit 70, AC is least, after this point as the degree of yield builds, AC likewise expanding.

(5) Average Variable costs (AVC): The cost per unit of variable output cost can be used to define the average variable cost. The average variable cost may rise or fall in response to rising production. The typical variable expense, which can be addressed graphically in Fig. By dividing the total number of outputs, we get 23.5. This formula determines the amount:

AVC = $\frac{TVC}{TQ}$ = ATC – AFC

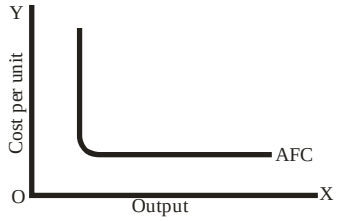


Fig 23.6: Average fixed cost (AFC)

AVC = $\frac{\text{TVC}}{\text{Q}}$

AVC = Average Variable Cost
TVC = Total Variable Cost
Q = Output

Table 4: Average Variable Costs

Output	Variable Costs (₦)	Average Fixed Cost (₦)
0	0	0
10	120	12
20	200	10
30	260	8.6
40	300	7.5
50	320	6.4
60	340	5.6
70	400	5.7
80	480	6

90	580	6.4
100	720	7.2

Table 4, passes on that whenever yield is zero, absolute variable expense is likewise zero, thus normal variable expense is moreover. Up to 60 units of yield, normal variable expense is falling, however it starts to augment from the seventh units. This is occurred because of consequences of law of variable degree.

(6) Average fixed cost (AFC): The average fixed cost of producing a unit of output can be defined as the fixed cost. Figure depicts it graphically. 23.7. Normal fixed cost is acquired by partitioning fixed cost (FC) by the quantity of units of result as reflected in this equation:

$$AFC = \frac{TFC}{Unit\ of\ output\ (Q)} = ATC - AVC$$

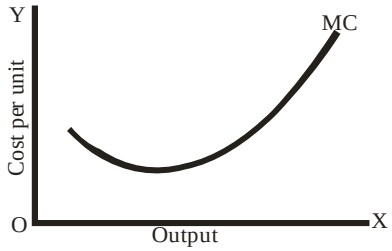


Fig 23.7: Marginal cost (MC)

$$\mathbf{AFC = \frac{TFC}{Q}}$$

AFC = Average Fixed Cost
TFC = Total Fixed Cost
Q = Quantity

Table 3: Average Fixed Costs

Output	Fixed Costs (₦)	Average Fixed Cost (₦)
0	100	∞
10	100	10
20	100	5
30	100	3.3
40	100	2.5
50	100	2
60	100	1.7
70	100	1.4
80	100	1.2
90	100	1.1
100	100	1

Table 3 passes on that as level of yield is expanding the Average Fixed Cost decreasing.

Figure 3, shows that the slant of normal fixed expense is descending inclining,

it implies as the degree of yield expands the normal fixed expenses decrease. Normal Fixed Cost bend is a rectangular hyperbola, in light of the fact that the complete region under the bend at various focuses will be something similar.

(7) Marginal Cost (MC): Marginal cost, which is also known as steady expense, is the additional cost of increasing yield by another unit. To put it another way, marginal cost is the difference in cost associated with producing an additional unit of an organization's output. For instance, if the expense of delivering 20 tubers of sweet potato is N50.00 and it cost N60.00 to create 21 tubers of a similar sweet potato, the N10.00 contrast in cost is known as minimal expense. In Figure, the marginal cost is depicted graphically. 23.7 and is determined by applying the formula:

MC = $\frac{Changes\ in\ TC}{Changes\ in\ output} = \frac{\Delta TC}{\Delta Q}$

$$\mathbf{MC} = \frac{\mathbf{\Delta TC}}{\mathbf{\Delta Q}}$$

where MC = Marginal Cost

ΔTC = Change in Total Cost

ΔQ = Change in Output

OR

$$\mathbf{MC} = \mathbf{TC_n - TC_{n-1}}$$

MC = Marginal Cost

TC_n = Total Cost of '$_n$' units

TC_{n-1} = Total Cost of '$_{n-1}$' units

Assuming the total cost of production of 70 units of a commodity is N100. When 80 units are produced, change in total cost is N120. Subsequently, the marginal cost is

MC = TCn¬¬ – TCn-1

MC = 120 – 100

MC = N20/ -

i) Samuelson, "Marginal Cost at any output level is the extra cost producing one extra unit more or less."

ii) Ferguson, "Marginal Cost is the addition to total cost due to the addition of one unit of output."

Table 5: Marginal Cost

Output	Total Costs (₦)	Marginal Costs (₦)
0	100	-
10	220	120
20	300	80
30	360	60

40	400	40
50	420	20
60	440	20
70	500	60
80	580	80
90	680	100
100	820	40

It is obvious from table 8, that negligible expense at first falls with the ascent in the degree of yield. After then, at that point steady and at last ascents with the ascent in degree of yield. Figure 9, uncovers that the state of MC is 'U' formed. In beginning MC falls with the ascent in degree of yield. At point 'M' MC is least and after 'M' point MC ascends with the ascent in the degree of yield.

Relationship between Total cost, Average Cost and Marginal Cost:-

i) Both AC & MC are calculated from TC.

a. Formula to calculate AC.

$$AC = \frac{TC}{Q}$$

b. Formula to calculate MC

$$MC = TC_n - TC_{n-1}$$

ii) When AC falls MC also falls. Figure 10, shows that when AC falls MC also fall more than AC. It means MC curve is below than AC.

iii) When AC rises, MC also rises – Figure 10 shows that after M point when AC runs, MC also rises more than AC.

iv) MC cuts AC at its minimum point M from below.

v) Attraction between AC and MC – Figure 11 shows that

- When MC>AC: - It pulls AC upwards.
- When MC = AC: - Then Ac is constant.
- When MC < AC: - Then MC pushes AC downward.

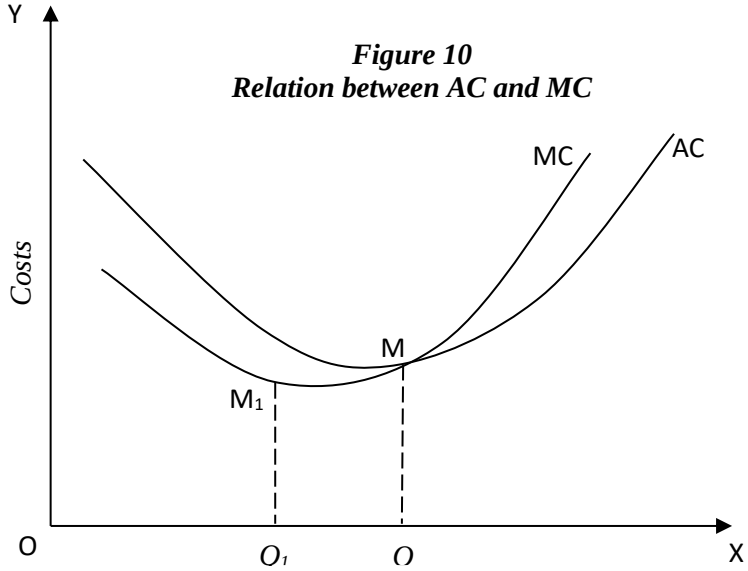


Figure 10
Relation between AC and MC

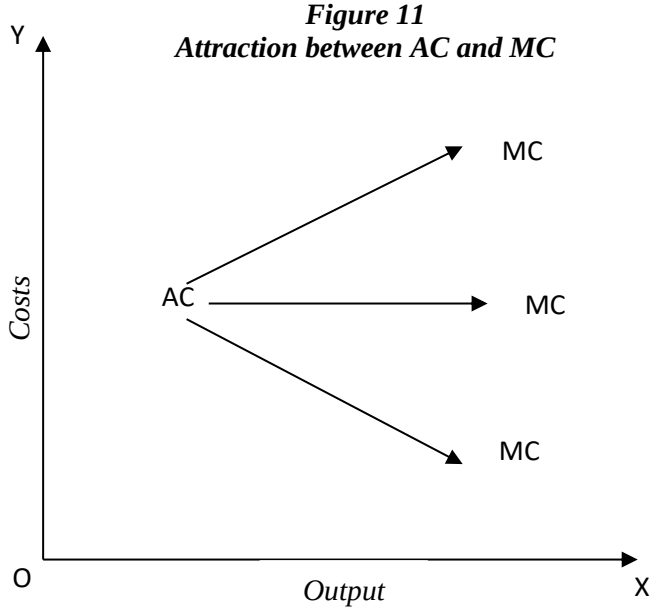


Figure 11
Attraction between AC and MC

Class Practices

1. From the table beneath, answer the accompanying inquiries

Beans (kg)	Total Revenue (N)	Marginal Revenue (N)	Total Cost (N)	Marginal Cost (N)
10	150	-	250	-
20	200	5	300	5
30	350	15	430	13
40	450	F	500	7
50	550	5	550	M
60	600	5	580	3
70	630	X	700	12

Find the values of F, M and X

Answer

To find F Note that MR is the contribution of the last unit to total revenue i.e. $\frac{\Delta TR}{\Delta Q} =$

$\frac{100}{10}$ $i.e.\frac{450-350}{40-30}$ = ₦10

M = $\frac{\Delta TC}{\Delta Q} = \frac{550-500}{50-40} = \frac{50}{10}$ = ₦5

X = $\frac{\Delta TR}{\Delta Q} = \frac{630-600}{70-60} = \frac{30}{10}$ = ₦3

3. Complete the following expense timetables and respond to the questions:

Output	**Total Cost (TC)**	**Average Cost (AC)**	**Marginal cost (MC)**
1	8	8	?
2	14	?	?
3	?	6	?
4	20	?	?
5	?	6	?
6	48	?	?

(a) At what result is AC at the base?

(b) At what result is MC at the base?

(c) At how result treats begin expanding?

(d) At how result treats begin to be more noteworthy than AC?

(e) What is most extreme result?

Answer

See the working before completing the table

2 – AC = $\frac{TC}{Q} = \frac{14}{2}$= 7; MC = $\frac{\Delta TC}{\Delta Q} = \frac{6}{1}$ = 6

3 – TC = AC x Q = 6 x 3 = 18 MC = $\frac{\Delta TC}{\Delta Q} = \frac{4}{1}$ = 4

4 – AC = $\frac{TC}{Q} = \frac{20}{4}$= 5; MC = $\frac{\Delta TC}{\Delta Q} = \frac{2}{1}$ = 2

5 – TC = AC x Q = 6 x 5 = 30 MC = $\frac{\Delta TC}{\Delta Q} = \frac{10}{1}$ = 10

6 – AC = $\frac{TC}{Q} = \frac{48}{6}$= 8; MC = $\frac{\Delta TC}{\Delta Q} = \frac{18}{1}$ = 18

Output	Total Cost (TC)	Average Cost (AC)	Marginal cost (MC)
1	8	8	
2	14	7	6
3	18	6	4
4	20	5	2
5	30	6	10
6	48	8	18

(a) AC is at the minimum when output is 4 units

(b) MC is at the minimum when output is 4 units
(c) AC begins to increase when output is 5 units
(d) MC starts to exceed AC when output is five units
(e) The maximum output is 6 units

3. Distinguish between
(a) Fixed Cost and Variable Cost

Answer

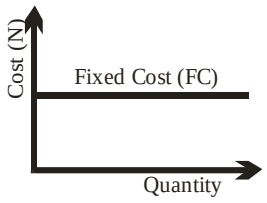
(a) **Fixed Cost**: Fixed Cost of production is the sum of the cost of all the Fixed inputs used in a production process. Fixed cost do not alter with the changing output in the short run which means no matter the level of production they remain fixed, example of this is cost of machinery, land etc. FC = TC – VC

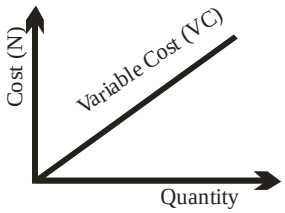
Variable Cost: On the other hand is the sum of all the variables inputs of production. It includes the cost of Labour, raw material and any other item whose cost change as output changes in the short run. Therefore, the more goods and services produced the higher they tend to be and vice versa. VC = TC – FC

4. Distinguish between fixed and variable cost

Answer

Fixed cost: refers to costs which do not alter with the level of production e.g. cost of building while variable costs are costs that varies with the level of production. If production increases variable cost will also increase and vice versa. e.g.





Contact2

Topic: **Theory of Costs and Revenue**
Subtopic: **Relationship between VC, MC, AVC, AFC and AFC, Concept of Explicit and Implicit cost, Opportunity costs and Money cost**
Class: **S.S. 2**
Duration: **40 minutes**

Performance Purposes

Toward the finish of the illustration, the students ought to have the option to:i.

i. Explain various relation that exist among costs
ii. Clarify the concept of explicit and implicit costs
iii. Differentiate between opportunity cost and money cost

- **Relationship between VC, MC, AVC, AFC and ATC**

Total Costs: The table below shows various costs incurred by Best Choice Company

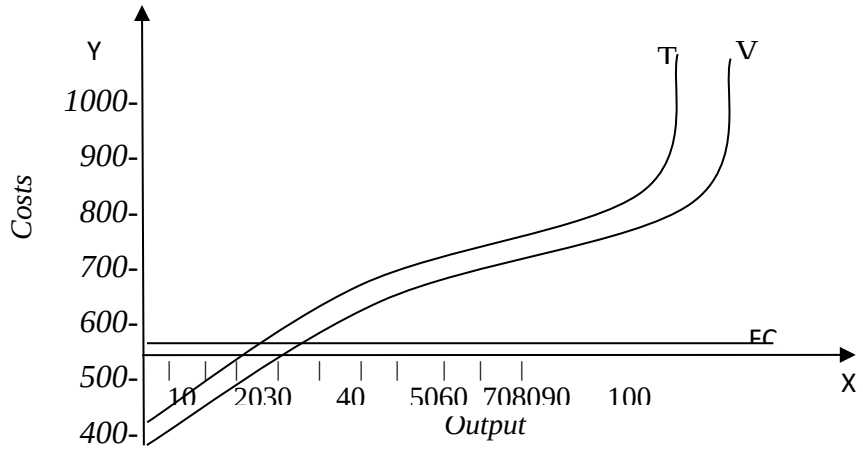
with level of outputs in the course of production in the year 2017.

Output	Fixed Costs (₦)	Variable Costs (₦)	Total Costs (₦)
0	100	0	100
10	100	120	220
20	100	200	300
30	100	260	360
40	100	300	400
50	100	320	420
60	100	340	440
70	100	400	500
80	100	480	580
90	100	580	680
100	100	720	820

Table 1, shows that when yield is zero, fixed expense is N100 and variable expense is N0, while complete expense is [FC(100+VC(0) =N100]. It uncovers that complete expenses are the amount of fixed and variable expenses. At the point when yield increments to 80 units all out costs go up N580 (N100+N480).

Figure 1 shows the connection between complete expenses, fixed expenses and variable expenses. Complete expenses are the aggregate of fixed and variable expenses.

At point O, yield is zero and variable expense is additionally zero yet fixed expense N100, thus all out costs is likewise N100. Complete Cost and variable expense bends are corresponding to one another.



Relation between AC, AFC and AVC: -

AC is the aggregate of AFC and AVC.

AC	=	AFC + AVC
AC	=	TC/Q
AFC	=	TFC/Q
AVC	=	TVC/Q
AFC	=	AC – AVC
AVC	=	AC - AFC

Table 7: Relation between AC, AFC & AVC

Output	Average Fixed Costs (₦)	Average Variable Costs (₦)	AC = AFC+AVC (₦)
0	∞	0	∞
10	100	120	220
20	50	100	150
30	33	86	119
40	25	75	100
50	20	64	84
60	17	56	73
70	14	57	71
80	12	60	72
90	11	64	75
100	10	72	82

Table 7 shows that at zero yield AFC is ∞ and AVC is zero, subsequently AC is equivalent to ∞. Then, [illegible] 14 and AVC is N57, subsequently AC is N71, [illegible] AC is expanding.

Figure - 8
Relation b/w AC, AFC & AVC

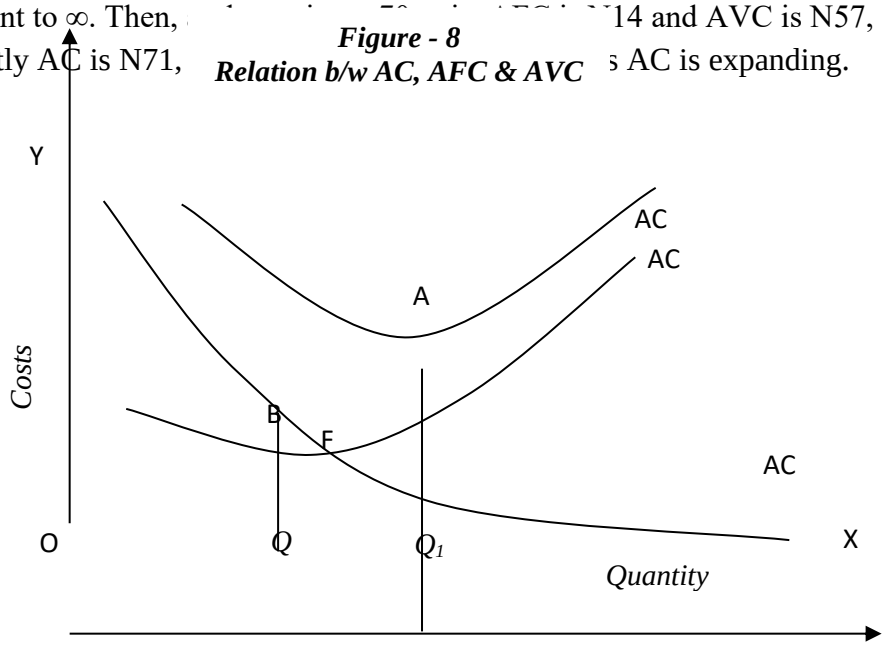


Figure Figure 8 uncovers that

- AC is acquired by adding of AFC and AVC.
- AC bend will in general approach AVC however it never contacts the last mentioned.
- On point 'A' AC is falling. Thus an association's AC is least since it utilizing its accessible assets and yield is most extreme, for example OQ1. After A point there is just ascent is cost however not underway. AVC least point is 'B', when level of yield is less for example OQ as contrast with OQ1.
- The blend of AFC and AVC at point F gives U shape and precisely over this point AC bend is appearing fit as a fiddle. It uncovers that AC is 'U' formed yet additionally is the blend of AFC and AVC.

Reasons for AC are 'U' molded.

AC is 'U' formed like English letter set 'U'. It shows that at first normal expense falls with the ascent underway, after then, at that point it comes to at its limit point because of greatest creation and after this it starts to rise up because of fall underway.

There are following reasons for 'U' state of AC: -

i) Basis of Internal Economies: - In short run when a firm increment its degree of creation then, at that point due to indivisibles of fixed factors firm gets its inside economies, for example, market economies, administrative economies, specialized economies and so forward Henceforth with the expansion underway level its expense per unit fall.

ii) Basis of Diseconomies: - In short run due to different diseconomies like helpless division of work, wasteful administration, poor or refreshed innovation, untalented work with the ascent level of creation, cost per unit increments.

iii) Basis of Law of Variable Proportions: - Law of variable extent is pertinent in short altercation which only one factor for example work is variable advertisement all components are fixed. Here are three phases of law of variable extent –

(a) Law of Increasing Returns to Factors: – When this law is appropriate with the ascent in degree of creation, the expense diminishes.

(b) Law of Constant Returns to Factors: – It implies now the creation is greatest because of ideal usage of variables, accordingly cost is least.

(c) Law of Decreasing Returns to Factors: - According to this law as the quantity of variable components builds, the creation creatures to lessen, which means cost per unit of creation increment.

Consequently these are the reasons for AC is 'U' formed.

- **Concept of Explicit and Implicit cost**

Example of Explicit cost- in the production of rice, Mr Uche, who is a rice farmer, has to ₦1500 for rice seedlings, ₦300 as transportation cost of the seedlings, ₦4000 for clearing and planting the seed and ₦5000 for harvesting the crop. All the expenses are referred to as explicit cost of producing rice.

Explicit costs are those expenses, which are paid to the others for their administrations and merchandise. As indicated by Leftwitch, Explicit expenses are those money installments which firms make to pariahs for their administrations and merchandise." These expenses are otherwise called out of parcels expenses or bookkeeping costs. Express expenses incorporate, following things of an association's consumption -

i. Cost of raw material
ii. Transportation cost
iii. Packing cost
iv. Power changes
v. Taxes
vi. Rent
vii. Wages
viii. Interest

Example of Implicit cost- When Bond Chemical Industry paid ₦14,000,000.00 as wages and salaries to his own staff, paid ₦500,000.00 as rents on his own land, paid ₦7,000,000.00 as interest on his own capital and ₦12,000,000.00 as profits for his own entrepreneurial functions, the industry would have incurred implicit cost.

Implicit costs are those expenses, which are paid by a business visionary to his own assets or components of creation (own property, own work, own capital and own structure and so forth) Certain expenses are expenses of self – possessed and independently employed assets." Implicit expense doesn't include an actual money installment, since it utilizes the components which a firm doesn't accepting or recruit however as of now claims. Certainly cash costs are as per the following:

i. Wages of his own labour
ii. Rent of his own land
iii. Interest on his own capital
iv. Profits for his own entrepreneurial functions.

Total Money Cost = Explicit Costs + Implicit Costs

- **Opportunity costs and Money cost**

Example of Opportunity costs, in a home of Mr. Adelodun, a sum of ₦3000 is in the family account. The family needed food stuff and a radio set, of which each would cost ₦3000. The family due to the limited resources, must choose to purchase one item at the expense of the other. The opportunity cost of the food is the radio set that the family has failed to purchase with the same amount of money, whereas the money cost of the food is N3000 in the event that the family chooses not to purchase a radio set. To produce a specific decent the assets must be removed/forfeited from the creation of different products. The expense of penance or inevitable for the following best utilization of asset is known as happenstance cost. As per Ferguson, the chance expense of delivering one unit of 'X'- product is the measure of 'Y'- item that should be forfeited. As per Leftwitch, opportunity Cost of a specific item is the worth of inevitable elective

items that assets utilized in its creation, might have delivered. In this way, the chance expense of any thing is alluded to as the option sworn off to purchase a thing while cash cost is the genuine measure of cash spent in purchasing such thing.

Illustration of Money costs-to deliver 10 shirts, a maker needs to pay N1000. Subsequently the cash cost is N1000 to create 10 shirts. Lease, compensation, premium, deterioration, pressing charges, transport cost, typical benefits cost of crude material, selling costs are remembered for cash costs. The cash cost of delivering a specific yield of a ware is then the amount of the multitude of installments to the components of creation occupied with the creation of that ware. It is that expense, wherein cost is caused as far as cash. In basic words, cash cost alludes to the measure of cash which is brought about to deliver a decent or administrations.

Class Practice

1. Complete the accompanying expense timetables and answer the inquiries that follow:

Output	**Total Cost (TC)**	**Average Cost (AC)**	**Marginal cost (MC)**
1	8	8	?
2	14	?	?
3	?	6	?
4	20	?	?
5	?	6	?
6	48	?	?

(a) At what result is AC at the base?

(b) At what result is MC at the base?

(c) At how result treats begin expanding?

(d) At how result treats begin to be more noteworthy than AC?

(e) What is most extreme result?

Answer

See the working before completing the table

2 – AC = $\frac{TC}{Q} = \frac{14}{2} = 7$; MC = $\frac{\Delta TC}{\Delta Q} = \frac{6}{1} = 6$

3 – TC = AC x Q = 6 x 3 = 18 MC = $\frac{\Delta TC}{\Delta Q} = \frac{4}{1} = 4$

4 – AC = $\frac{TC}{Q} = \frac{20}{4} = 5$; MC = $\frac{\Delta TC}{\Delta Q} = \frac{2}{1} = 2$

5 – TC = AC x Q = 6 x 5 = 30 MC = $\frac{\Delta TC}{\Delta Q} = \frac{10}{1} = 10$

6 – AC = $\frac{TC}{Q} = \frac{48}{6} = 8$; MC = $\frac{\Delta TC}{\Delta Q} = \frac{18}{1} = 18$

Output	Total Cost (TC)	Average Cost(AC)	Marginal cost (MC)
1	8	8	
2	14	7	6
3	18	6	4
4	20	5	2
5	30	6	10
6	48	8	18

(a) AC is at the minimum when output is 4 units

(b) MC is at the minimum when output is 4 units

(c) AC begins to increase when output is 5 units

(d) When output is 5 units, MC begins to outperform AC.

(e) 6 units is the maximum output.

2. Cost Agenda of an Industry

Output	Total Fixed Cost TFC (N)	Total Variable Cost TVC (N)	Total Cost TC (N)	Average Variable Cost AVC (N)	Average Total Cost ATC (N)	Marginal Cost MC (N)
0	100	0	100	0	100	-
1	100	40	140	?	?	?
2	100	64	164	?	?	?
3	100	80	180	?	?	?
4	100	88	188	?	?	?
5	100	96	196	?	?	?

From the expense plan above, ascertain the Average Variable Cost (AVC), Average Total Cost (ATC) and Marginal Cost (MC) of the firm. Show your activities plainly.

Answer

Output	Total Fixed Cost TFC (N)	Total Variable Cost TVC (N)	Total Cost TC (N)	Average Variable Cost AVC (N)	Average Total Cost ATC (N)	Marginal Cost MC (N)
0	100	0	100	0	100	-
1	100	40	140	A	B	C
2	100	64	164	D	E	F
3	100	80	180	G	H	I
4	100	88	188	J	K	L
5	100	96	196	M	N	O

From the cost Schedule above calculate A – O

Solution

(a) AVC = $\frac{TVC}{Q} = \frac{40}{1} = 40$ (b) ATC = $\frac{140}{1} = 140$

(c) MC = $\frac{\Delta TC}{\Delta Q} = \frac{140-100}{1} = \frac{40}{1} = 40$ (d) AVC = $\frac{TVC}{Q} = \frac{64}{2} = 32$

Use the above method to work out E to O

3. Distinguish between
   (a) Fixed Cost and Variable Cost
   (b) Marginal Cost and Marginal Revenue
   (c) Total Cost and Total Revenue
   (d) Average Cost and Average Revenue

Answer

(a) **Fixed Cost**: Fixed Cost of creation is the amount of the expense of all the Fixed inputs used in a production process. Fixed cost remains constantinspite of the changing output in the short run which means no matter the level of production they remain fixed, example of this is cost of machinery, land etc. FC = TC – VC
Variable Cost: On the other hand, is the sum of all the variables inputs of production. It includes the cost of Labour, raw material and any other item whose cost change as output changes in the short run. Therefore, the more goods and services produced the higher they tend to be and vice versa. VC = TC – FC

(b) **Marginal Cost:** marginal cost is the modification in total cost as a result of a unit change in output. Marginal cost does not depend on Fixed cost. It depends on the Variable cost. MC = $\frac{\Delta TC}{\Delta Q}$

Marginal Revenue: Marginal revenue is the changes in the total revenue as a result of a change in quantity sold. MR = $\frac{\Delta TR}{\Delta Q}$

(c) **Total Costand Total Revenue**: The total cost of production is the sum of all the fixed and the variable cost incurred during production process. This varies with the level of output. TC = FC + VC. While Total Revenue is the total amount of money earned by selling a given level to output. Total revenue may increase, remain constant or decrease with changes in price. TR = PX_q

(d) **Average Cost and Average Revenue**: Average cost is the fixed cost (TC) divided by the total output (Q) it is the unit cost i.e. $\frac{TC}{Q}$ = AC

While Average Revenue is the unit price. It is the total revenue (TR) divided by the output (Q). $\frac{TR}{Q}$ = AR

4. The result and cost of creation of rice (in packs) are introduced in the table beneath. Utilize the data in the table to address the inquiries that follow

(a) Calculate the

(i) Average Fixed Cost (AFC) at output levels 0, 2 and 4

(ii) Marginal Cost (MC) at all levels of output

(b) If the price of a bag of rice were $10,

(i) Calculate the profit/loss at all levels of output

(ii) at what output level(s) is the maximum profit made?

(c) Draw the marginal cost curve (the use of graph sheet is essential)

Answer

3i. when output level is 0

AVC = $\frac{TC}{Q} = \frac{7}{0} = \infty$ (infinity)

When output level is 2

AFC = $\frac{FC}{Q} = \frac{7}{2}$ = $3.5

When output level is 4

AFC = $\frac{FC}{Q} = \frac{7}{4}$ = $1.75

ii. At output 0, Marginal cost (MC) = 7 – 0 = $7

At output 1, Marginal cost (MC) = 12 – 7 = $5

At output 2, Marginal cost (MC) = 14 – 12 = $2

At output 3, Marginal cost (MC) = 17 – 14 = $3

At output 4, Marginal cost (MC) = 27 – 17 = $10

b. If the price of a bag of rice were $10

(i) The profit/loss at all levels of output

At output 0, Profit/loss = TR – TC

TR = $10 x 0 = 0

TC = $7

Profit/loss = 0 – 7 = $7.00 loss or $-7.0

At output 1,

TR = $10 x 1 = 10, TC = $12

Profit/loss = $10 – 12 = $2.00 loss or $-2.0

At output 2,

TR = $10 x 2 = 20, TC = $14

Profit = $20 – 14 = $6.00

At output 3,

TR = $10 x 3 = 30, TC = $17

Profit = $30 – 17 = $13.00

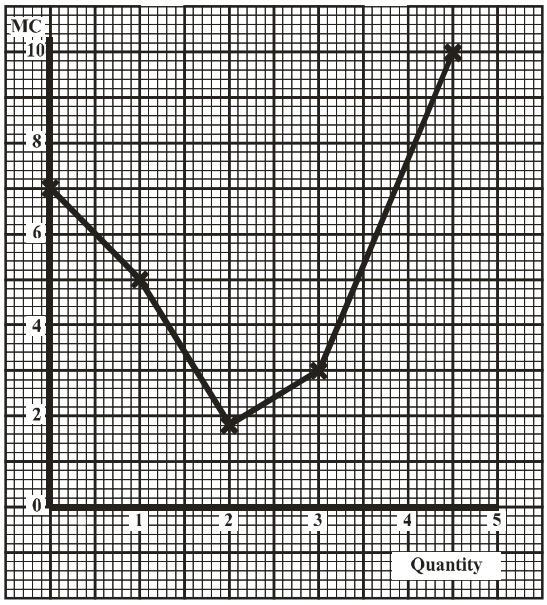
At output 4,

TR = $10 x 4 = 40, TC = $27

Profit = $40 – 27 = $13.00

(ii) Maximum profit is made when output is 3 bags and 4 bags.

c. Marginal Cost Curve



Contact 3

Topic: **Theory of Costs and Revenue**

Subtopic: **Short-run and long-run costs and Distinction between Economist's and Accountant's views of Cost**

Class: **S.S. 2**

Duration: **40 minutes**

Performance Purposes

Toward the finish of the example, the students ought to have the option to:Distinguishbetween short-run and long-run costs

a. Distinguish between economist's and accountant's views of cost

i. Short-Run and Long-Run Costs

Short-run cost: The time period during which some of the company's useful components, such as its structure, capital, equipment, and expenses, are fixed and some are variable is known as the short-run cost. It is a period of time during which a company's hardware, assets, and responsibilities are fixed but not long enough for the company to use more or less factor elements of production like work and crude materials to change its yield in response to interest.

To be underway during the time of short-run, the firm should have the option to take care of its variable expenses. On the off chance that the cost of the item is identical to the minor expense, it will prompt low benefit except if its normal variable expense is covered. Any cost beneath the normal variable expense, the firm will actually want to take care of its proper expenses.

It is proposed that when an organization's typical cost is more conspicuous than its worth, the expense is more essential than AVC. Over time, such a company ought to cease operations. This is because, in the long run, any additional development will exacerbate problems.

Long-run cost: The period of time during which all of the input creation measures are variable is the long-term cost. While short-term options manage the activity of the current efficiency limit, the long run is an planning period during which a businessperson selects the plant size that is best for his tasks and makes his plans.

ii. Distinction between Accountant's and Economist's Views on Cost

The economist's view of cost is quite different from the way an accountant views it. The economist views cost in terms of opportunity cost, that is, the forgone alternative, namely how an individual can sacrifice one thing in order to obtain another. The money spent on a commodity is not what bothers the economist but the alternative commodity that is left un-bought in order to purchase that commodity.

On the other hand, the accountant views cost in terms of the amount of money spent in order to have a commodity. In other words, the accountant view cost in terms of actual payment made, which is referred to in Economics as money cost.

In summary, an economist views cost in terms of opportunity cost, while an accountant views cost in terms of actual money spent.

Contact 4

Topic: **Theory of Costs and Revenue**
Subtopic: **Cost of Production Schedule, and Mathematical Approach to Cost**
Class: **S.S. 2**
Duration: **40 minutes**

Performance Purpose

Toward the finish of the example, the students ought to have the option to:

a. Calculate various cost of production

➢ COST OF PRODUCTION SCHEDULE

There are numerous ways in which the various concepts discussed are connected to one another. Their various formulas make it simple to compute or calculate them mathematically.

The expense ideas are better deciphered and perceived when they are organized in a timetable called the expense of creation plan as in Table 23.1. Any absent figure(s) can be determined or topped off utilizing other expense values and their individual formulae

Unit of Output (TQ) N	Total Fixed Cost (TFC) N	Total variable Cost (TVC) N	Total Cost (TC) N	Average Total Cost (ATC) N	Average Variable cost (AVC) N	Average fixed cost (AFC) N	Marginal cost (MC) N
1	20	12	32	32	12	20	-
2	20	14	34	17	7	10	2
3	20	16	36	12	5.3	6.6	2

4	20	18	38	9.5	4.5	5	2
5	20	20	40	8	4	4	4
6	20	22	42	7	3.6	3.3	2
7	20	24	44	6.3	3.4	2.8	2

Table 1: Cost schedule of a firm

- **MATHEMATICAL APPROACH TO COSTS**

As expressed before, a portion of the figures in Table 23.1 might be absent and you are expected to top them off. Using the various cost concept formulas to solve them is one way to accomplish this.

Example 1

Complete the going with cost timetables and answer the inquiries that follow.

Output (Q)	**Total Cost (TC)**	**Average cost (AC)**	**Marginal Cost (MC)**
1	18	8	-
2	14	?	?
3	?	6	?
4	20	?	?
5	?	6	?
6	48	?	?

a. At what result is AC at the base?

b. At what result is MC at the base?

c. At how result treats begin expanding?

d. At how result treats begin to be more prominent than AC?

e. What is the greatest result? (SSCE August, 1991)

Solution

Output (Q)	**Total Cost (TC)**	**Average cost (AC)**	**Marginal Cost (MC)**
1	18	8	-
2	14	c	f
3	a	6	g
4	20	d	h
5	b	6	i
6	48	e	j

TC = AC x output

a = output 3

TC = AC x output = 6 x 3

TC = 18

b = TC = 6 x 5

TC = 30

c = AC = $\frac{TC}{Output}$ = $\frac{14}{12}$ = 1.16

d = AC = $\frac{20}{4}$ = 5

f = MC at output 2

TC 2 – TC = 14 – 18 = 6

g = MC at output 3 = 18 – 14 = 4

h = MC at output 4 = 20 – 18 = 2

i = MC at output 5 = 30 – 20 = 10

j = MC at output 6 = 48 – 30 = 18

(a) Output 4 units

(b) Output 4 units

(c) Output 5 units

(d) Output 5 units

(e) Maximum output is 6 units

Example

Cost agenda of an Industry

Output (Q) N	**Total Fixed Cost (TFC) N**	**Total variable Cost (TVC) N**	**Total Cost (TC) N**	**Average Variable cost (AVC) N**	**Average Total (ATC) N**	**Marginal cost (MC) N**
0	100	0	100	0	100	-
1	100	40	140	?	?	?
2	100	64	164	?	?	?
3	100	80	180	?	?	?
4	100	88	188	?	?	?
5	100	96	196	?	?	?

From the cost plan in 180 the table above, compute the normal variable expense (AVC), normal complete expense (ATC) and3 peripheral expense (MC) of the firm. Show your working plainly (SSCE June, 1993).

Solution

Output (Q)	**TFC**	**TVC**	**TC**	**AVC**	**ATC**	**MC**
0	100	0	100	0	100	-
1	100	40	140	40	140	40
2	100	64	164	32	82	24
3	100	80	180	27	60	16
4	100	88	188	22	47	8
5	100	96	196	19.2	39.2	8

(a) AVC = $\frac{TVC}{Q}$ = $\frac{40}{1}$ = 40

= $\frac{64}{2}$ = 32

= $\frac{80}{3}$ = 27

$= \frac{88}{4} = 22$

$= \frac{96}{5} = 19.2$

(b) ATC = $\frac{TC}{\Delta Q}$ $= \frac{140}{1} = 140$

$= \frac{164}{2} = 82$

$= \frac{180}{3} = 60$

$= \frac{188}{4} = 47$

$= \frac{196}{5} = 39.2$

(c) MC = $\frac{\Delta TC}{\Delta Q}$ = 140 - 100 = 40

= 164 - 140 = 24

= 188 - 180 = 8

= 196 - 188 = 8

Practicing Exercises

11.

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

In the above table, the negligible expense of the third item of result is (a) 9 (b) 10 (c) 6 (d) 2 (e) 12

12.

Quantity	Fixed Cost ₦	Variable Cost ₦	Total Cost ₦	Marginal Cost ₦	Average Cost ₦
1	750	200	950	-	950
2	750	560	1310	360	655
3	750	900	1650	?	550

The above table shows the short run expenses of a firm. What is the company's negligible expense for the third thing delivered? (a) ₦350.00 (b) ₦340.00 (c) ₦360.00 (d) ₦370.00 (e) ₦505.00

13.

Output	Total Costs (₦)
1	20
2	56
3	96

4	144
5	160

In the table above, the marginal cost when output is two units is, (a) ₦16.00 (b) ₦20.00 **(c) ₦26.00** (d) ₦40.00 (e) ₦48.00

14.

Q (tons)	60	70	80	90	100
TC (₦)	680	870	840	960	1100
MC (₦/ton)		10	6	12	14

Consider the table above showing yield (Q), complete expense (TC) of creation and minimal expense (MC) for a firm in a serious market. Assume value (P) = N12, what is the greatest benefit the firm can make? (a) N1200.00 (b) N200.00 (c) N40.00 (d) N100.00

15.

Units of variable input	**Total output**	**Total fixed cost**	**Total variable cost**
0	0	1000	0
1	30	1000	1000
2	80	1000	1240
3	160	1000	1720
4	200	1000	1900
5	220	1000	2000

Calculate the marginal physical product of the unit (a) 0 (b)100 (c) 40 (d) 20

Contact5

Topic: **Theory of Costs and Revenue**

Subtopic: **Revenue Concepts, Relationship between Average Revenue and Marginal Revenue and Profit**

Class: **S.S. 2**

Duration: **40 minutes**

Performance Aim

At the end of the lesson, the students should be able to:

a. Define revenue
b. Distinguish between the different revenue concepts (total, average, marginal)
c. Draw different revenue curves.
d. Explain the relationship between revenue and production.

- **MEANING OF REVENUE AND PROFIT**

Definition: Revenue may be defined as all the money income accruing to a firm from the sale of goods and services, assets or investment.

Definition: The profit of a firm is defined as the difference between the total revenue

and total cost. It is expressed mathematically as:

Profit = TR – TC where

TR = Total Revenue

TC = Total Cost

The profits earned by a firm depend on the relationship between its cost and revenue. If the firm's total revenue exceeds its total cost, the firm makes **profit** but when its total cost exceeds its total revenue, the form makes**losses**.

Just as the firm incurs different kinds of costs in its production activities, so also does it obtain different kinds of revenues from its sales activities.

- **TYPES OF REVENUE**

Three main types of revenue can be distinguished in economics. These are:

1. Total revenue
2. Average revenue, and
3. Marginal revenue

Total revenue

Total revenue (TR) is the total amount of income generated from the sale of a firm's products. It is represented by a formula TR = Price x Quantity sold or AR x Quantity sold. It is directly dependent on the quantity of goods sold, so that the higher the quantity sold, the higher the total revenue. Mathematically, the total revenue is the product of the quantity of the commodity sold and the selling price per unit. For example, if a firm sells 60 unit of a commodity at a selling price of N40 each then the total revenue = 60 x ₦40 = ₦2,400.00

Diagrammatically, the total revenue curve is shown in Fig. 24.1

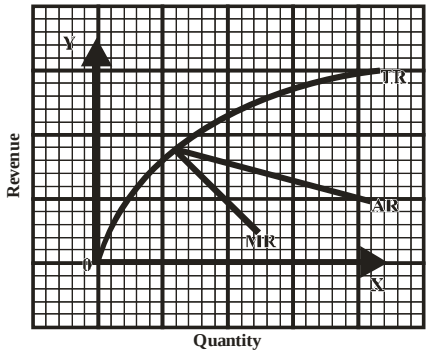


Fig 24.1: Revenue Curves of a Firm

Average revenue

Average revenue (AR) is the revenue per unit of product sold. It is also equal to the price of the firm's product. It represented by a formula:

AR = $\frac{TR}{O}$ or AR = P

It is obtained by dividing total revenue from a given number of units sold by that number of units. In the short run, the average revenue may be inversely related to the quantity sold. Thus, the average revenue may fall as the quantity sold increases. This is

shown diagrammatically in Fig 24.2.

Marginal Revenue

Marginal Revenue (MR) is the addition of total revenue as an additional unit of the product is sold. It is represented by a formula:

MR = $\frac{TR}{\Delta Q}$ OR $\frac{TR_2}{Q_2}$ - $\frac{TR_1}{Q_1}$

It is the change in total revenue as a result of selling one more unit of a commodity. For example, if total revenue is N90 from the sales of 9 units and N95 from the sale of 10 units, the marginal revenue from the 10th unit sold is N95 – N90 = N5. In the short-run, the marginal revenue may fall as the quantity sold increases.

RELATIONSHIP BETWEEN AVERAGE REVENUE AND MARGINAL REVENUE

The relationship between the marginal revenue and the average revenue of a firm in the short-run is that both may fall as the quantity sold increases, but the marginal revenue falls faster than the average revenue. This evident in Fig. 24.2

Worked Example

Study the diagram below carefully and use the given information to answer the questions that follow:

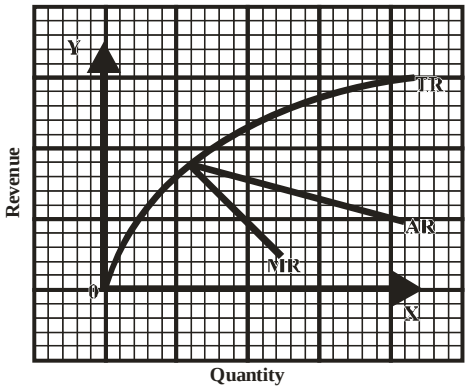


Fig. 24.3: Marginal Revenue Cost

(a) Determine:

d. the profit maximizing output;
e. the firm's profit if it produces 600 units of output
f. the total cost if the firm produces 400 units

(b) Calculate the

(iii) total revenue

(iv) profit of the firm at the output level of 900 units

(c) What will happen if a firm's market price falls below its average variable cost?

Solution

(a)(i) Profit-maximizing output level is 900 because at this output level MC = MR

(ii) TR = \$10 x 600 = \$6,000

TC = \$6 x 600 = \$3,600

Profit = TR – TC = $2,400

(iii) TC = P x Q

$10 x 400 = $4,000

(b)(i) TR = P x Q

= $10 x 900 = $9000

(ii) At 900 units TR – TC, TC

= $8 x 900 = $7,200

Profit = $9,000 - $7,200

= $1,800

(c) At any time, price (AR) is below the average variable cost, TR will be less than TVC and operating profit will be negative, that is, there will be loss on operation. The firm will eventually close down.

Practicing Exercise

Use the table below to answer questions

Output in Units	**Total Revenue in ₦**	**Average Revenue in ₦**	**Marginal Revenue in ₦**
1	20	20	-
2	38	19	18
3	54	-	16
4	68	-	-
5	80	16	-

18. a. Calculate the average revenue of 3 and 4 units

b. Calculate the marginal revenue of 4 and 5 units

Solution

a. i. AR = $\frac{TR}{O}$ or AR = P

For output unit 3,

AR= 54/3

=18

ii. AR = $\frac{TR}{O}$ or AR = P

For output unit 4,

AR= 68/4

=17

b. MR = $\frac{TR}{\Delta Q}$ OR $\frac{TR_2}{Q_2}$ - $\frac{TR_1}{Q_1}$

i. For output unit 4,

MR= 68-54

=14

ii. For output unit 5,

MR= 80-68 **=12**

Contact 6
Topic: **Taxation**
Subtopic: **Meaning, Features and Principles of good tax system**
Class: **S.S. 2**
Period: **40 mins**

Objectives
Toward the finish of the illustration, the students ought to have the option to:

a. Define taxation
b. Explain characteristics of tax
c. List and explain principles of good tax system

Presentation
Case 1:
The Federal Government has decided to collect 5% on every income of earn by individual's government workers and firms or on goods and services for the provision of needed public services. This singular act of the government is regarded as _____. With this illustration, give brief description of taxation and tax.
Solution:
When government has decided to collect 5% of all earns on goods and services of all individuals, government workers and firms for the provision of public utility, this act is known as taxation. Therefore, taxation is the act or technique for forcing a necessary duty by the public authority or its office on people and firms, or on labor and products. Duty, then again, can be portrayed as a necessary toll forced by the public authority or its office on people and firms or on labor and products.

Example 2:
Use the illustration in example 1 to explain different characteristics of tax.

Solution:
From the illustration in example 1, the following characteristics of tax can be found:

a. The tax is imposed by the government of its agency.
b. There is compulsory levy of 5% on all individuals and firms or on goods and service.
c. The imposed levy is meant for the provision of social/public utility.
d. The 5% imposed levy is a sacrifice on the part of those that are paying them.
e. Although this feature is not found in the illustration, tax payment has age limit. A minor cannot pay tax since he is less than 18years old.

Contact 7
Topic: **Taxation**
Subtopic: **Reasons for Government imposition of taxes and Economic effects of taxation**

Class: **S.S. 2**
Duration: **40 minutes**

Objectives

Toward the finish of the example, the students ought to have the option to:

i. Explain reasons for imposing taxes; and
ii. List and discuss the economic effects of taxation

Presentation

- **Reasons for Government imposition of taxes**

Reasons for imposing tax include:

1. To raise revenue
2. To redistribute income
3. Discouragement of production and consumption of harmful goods
4. To control inflation
5. To protect infant industries
6. Promotion of economic growth
7. Retaliatory measure
8. Employment purposes
9. savings

- **Economic effects of taxation**

Tax imposition can be feet on the following:

1. Production
2. Inflation
3. Consumption/investment
4. Prices of goods and services
5. Salaries of workers
6. Demand and supply
7. Savings

Presentation

Case 1:

Contact 8

Topic: **Taxation**
Subtopic: **Problems associated with tax collection and Incidence of taxation**
Class: **S.S. 2**
Period: **40 mins**

Objectives

Toward the finish of the example, the students ought to have the option to::

a. Describe confronting problems of collecting tax
b. Give meaning of incidence of taxation

Presentation

Case 1:

Adeola and Olawumi are friends and they are self-employed. The duo had refused to pay their tax in the recent times. Due to government's poor effort in providing social amenities, indiscriminate high taxation, corruption of public officers and improper tax record keeping, Adeola had vowed not to pay this statutory levy. On the other hand, Olawumi had refused to pay his tax because his record of tax payment had been tampered with by the tax collectors. In the same vein, Chinedu whose profit's worth is more than 15,000,000.00 had declared 10,000,000.00 as the gain at end of year 2015.

Considering the scenario above, discourse the problems associated with tax collection.

Solution:

Students are expected to list and discuss problems affecting tax collecting base on the case presented in example 1.

Case 2:

Hassan who is an importer and exporter ought to have imported new technological devices from China into the nation. Likewise, he supposed to have exported local craft to Germany but the tax levy on his goods seems high, what effect will these have on his business? In another situation, after salaries and wages' increase the government decided to impose some taxes on the income, what effect will this have on consumptions, cost of labor and products, request and supply, and investment funds of workers?

Solution:

Students are expected to discuss economic effects of taxation.

Contact 9

Topic: **Taxation**

Subtopic: **Types of taxation and Systems of taxation**

Class: **S.S. 2**

Period: **40 mins**

Objectives

Toward the finish of the example, the students ought to have the option to:List and explain two types of taxation

a. List and explain systems of taxation

Presentation

Case 1:

Charles, who works as a Doctor in a multinational hospital in Ikeja, earns 180,000 per month and he is made to pay 18% as his income tax. His employer also

pays company tax of 8.5% of the entire profit make in the whole year. Furthermore, he likes Agege bread that has 2.5% tax. Briefly discuss the two types of tax mentioned in this scene.

Solution:

Students are expected to use this scenario to explain direct and indirect taxes with their types.

Case 2:

The table underneath shows the salaries and rates of income tax levied on four professionals in an economy

Profession	**Income per month(s)**	**Tax rate (%)**	**Disposable income (₦)**
Nurse	6000	15	
Engineer	7000	12	
Doctor	8000	10	
Civil servant	5000	18	

Utilize the above information to address the inquiries that follow:

a. Calculate the expendable salaries of the four people

b. What arrangement of tax assessment was utilized?

c. Give explanations behind your response in 2(b)

d With the guide of a chart, clarify the arrangement of tax assessment utilized in 2(b)

Solution:

a. Disposable Income = $\frac{\text{income per month} \quad \text{tax rate}}{1 \quad x \quad 100}$

Doctor: $\frac{₦800 \quad 10}{1 \quad x \quad 100}$ = **₦800**

Engineer: $\frac{₦700 \quad 12}{1 \quad x \quad 100}$ = **₦840**

Civil Servant: $\frac{₦500 \quad 18}{1 \quad x \quad 100}$ = **₦900**

Civil Servant: $\frac{₦600 \quad 15}{1 \quad x \quad 100}$ = **₦900**

b. The system of taxation employed is known as regressive tax

c. It is regressive tax because higher earners like doctor and engineer were paying lower tax while lower earners like Nurse and Civil servant were paying higher tax. It can then be said that the higher the income, the lower the tax paid, while the lower the income, the higher the tax paid.

d. Regressive Tax System

From the graph above, we can see that there is a development along the bend from left to right. This implies that those that earn little salary pay more tax than those earning much. The kind of tax system is lopsided because it takes more from the poor than the rich. Due to much tax being levy on the low earners, this is possibility of low savings among this category of people. Also, the low earner will spend more of their income on consumption rather than investment. Besides, the per capita income has been reduced due to high tax being melted out to them. On the other hand, the higher earners who pay little tax are at advantage of doing what the lower earner cannot do. A vivid example of this tax system is poll tax.

APPENDIX VIII

THE INTERNATIONAL CENTRE FOR EDUCATIONAL EVALUATION (ICEE)
INSTITUTE OF EDUCATION,
UNIVERSITY OF IBADAN

TOPICS AND SUB-TOPICS FOR THE STUDY

Contacts	Topic	Contents	Duration
1	**Concept of Costs and Revenue**	Definition of cost of production and basic cost concepts and Relationship between total, average and Marginal costs	**40 minutes**
2		Relationship between VC, MC, AVC, AFC and AFC, Concept of Explicit and Implicit cost, Opportunity costs and Money cost	
3		Short-run and long-run costs and Distinction between Economist's and Accountant's views of Cost	
4		Cost of production schedule, and Mathematical Approach to Cost	
5		Revenue concepts, Relationship between average revenue and marginal revenue, and Profit	
6	**Taxation**	Meaning, Features and Principles of good tax system	
7		Reasons for Government imposition of taxes and Economic effects of taxation	
8		Problems associated with tax collection and Incidence of taxation	
9		Types of tax and Systems of taxation	

APPENDIX IX

THE INTERNATIONAL CENTRE FOR EDUCATIONAL EVALUATION (ICEE)
INSTITUTE OF EDUCATION,
UNIVERSITY OF IBADAN

SAMPLES OF ESSAY ITEMS FOR STUDENTS' PRACTICE

Complete the following expense timetables and respond to the following questions:

Output	Total cost TC	Average cost AC	Marginal cost MC
1	8	8	
2	14	?	?
3	?	6	?
4	20	?	?
5	?	5	?
6	48	?	?

a. At what result is AC at the base?
b. At what result is MC at the base?
c. At how result treats begin expanding?
d. At how result treats begin to be more prominent than AC?
e. What is most extreme result? (WAEC Question 2, 1991)

1.

Tonnes of Fertiliser applied	Total Production in Bags	Marginal product
0	1000	
1	110	100
2	1250	150
3	1500	250
4	?	400
5	?	250
6	?	125
7	2350	?
8	2380	?
9	2330	?

a. In the absence of compost application, what will the total yield of maize be?
b. Calculate the complete item after the utilization of the accompanying amounts of compost: (I) 4 tons (ii) 5 tons (iii) 6 tons

c. Calculate the minimal item after the utilization of the accompanying amounts of compost: (I) 7 tons (ii) 8 tons (iii) 9 tons

d. (i) After what level of the use of compost does a reducing minimal return happen? (ii) After what level of manure application the complete yield lessening will? (WAEC Question 2, 1991)

2. From the table underneath, answer the accompanying inquiries:

Output of Beans (Kg)	Total Revenue (₦)	Marginal Revenue (₦)	Total Cost (₦)	Marginal Cost (₦)
10	150	-	250	-
20	200	5	300	5
30	350	15	430	13
40	450	A	500	7
50	550	5	550	B
60	600	5	580	3
70	630	C	700	12

(c) Track down the potential gains of A, B and C

(d) (i) what might be the benefit amplifying result of this firm

(ii) If this industry were working under contest, what should be the cost of her item? (WAEC Question 2, 1988)

TAXATION

1. a) What is taxation?

b) Highlight the various tax systems.

2. The table underneath shows the salaries and rates of income tax levied on four professionals in an economy

Profession	Income per month(s)	Tax rate (%)	Disposable income (₦)
Nurse	6000	15	
Engineer	7000	12	
Doctor	8000	10	
Civil servant	5000	18	

Utilize the above information to address the inquiries that follow:

a. Calculate the expendable salaries of the four people

b. What arrangement of tax assessment was utilized?

c. Give explanations behind your response in 2(b)

d With the guide of a chart, clarify the arrangement of tax assessment utilized in 2(b)

Marking Guide for Samples of Essay Items for Students' Practice

The following steps should be taken in scoring this set of items:

Question 1 Solution:

Calculate for the missing value in the table

Output	Total cost TC	Average cost AC	Marginal cost MC
1	8	8	
2	14	TC/Q= 14/2= **7**	ΔTC/ΔQ= 6/1= **6**
3	AC x Q= 6 x 3= **18**	6	ΔTC/ΔQ= 4/1= **4**
4	20	TC/Q= 20/4= **5**	ΔTC/ΔQ= 2/1= **2**
5	AC x Q= 5 x 5= **25**	5	ΔTC/ΔQ= 10/1= **10**
6	48	TC/Q= 48/6= **8**	ΔTC/ΔQ= 18/1= **18**

a. **Step 1**: AC is at the minimum when output is 4 units **1 mark**
b. **Step 2**: MC is at the minimum when output is 4 units **1 mark**
c. **Step 3**: AC begins to increase when output is 5 units **1 mark**
d. **Step 4**: MC starts to be greater than AC when output is 5 units **1 mark**
e. **Step 5:** The maximum output is 6 units **1 mark**

Question 2 Solution:

a. In the absence of fertilizer, the land produces 1,000 bags of maize **1 Mark**
b. $TP_1 = TP_0 + MP_1$, where TP_1 = Present total output; TP_0 = Immediate past total output; MP_1 = Present Marginal output

   Step 1: (i) When 4 tonnes of fertilizer is applied

   $TP_1 = 1500 + 400 =$ **1900** **1 Mark**

   Step 2: (ii) When 5 tonnes of fertilizer is applied

   $TP_1 = 1900 + 250 =$ **2150** **1 Mark**

   Step 3: (iii) When 6 tonnes of fertilizer is applied

   $TP_1 = 2150 + 125 =$ **2275** **1 Mark**
c. The marginal product represents the change in total product as a result of increasing fertiliser application by one unit, i.e., MP = ΔTP/ΔF, where MP= Marginal Product, ΔTP = change in total product, ΔF = change in the level of fertiliser applied

   Step 1: (i) The marginal product at 7 tonnes of fertilizer is

   $MP_1 = \frac{2350 - 2275}{7 - 6} = \frac{75}{1}$

   = **75** **1 Mark**

   Step 2: (ii) The marginal product at 8 tonnes of fertilizer is

   $MP_1 = \frac{2330 - 2380}{9 - 8} = \frac{-50}{1}$

   = **-50** **1 Mark**
d. **Step 1:** (i) Diminishing returns occurred after the application of 4 tonnes of fertiliser **1 Mark**

   Step 2: (ii) Total output will decrease after the application of 8 tonnes of fertilizer. **1 Mark**

Question 3 Solution:

a. To find F, note that MR is the contribution of the last unit to total revenue i.e

i. **Step 1**: To determine the F:

F = ΔTR/ΔQ= 100/10 (i.e 450 -350)/ (i.e 40 -30) = ₦10 **1mark**

ii. **Step 2**: To determine the M:

M= ΔTR/ΔQ = (550 -500)/ (50 - 40) = 50/10 = ₦5 **1mark**

iii. **Step 3**: To determine the X:

X = ΔTR/ΔQ = (630-600)/ (70-60) = 30/10 = ₦3 **1mark**

b. i. **Step 1:** The firm will maximise profit at the output level where MR =MC. That is when output is 50kg. **1mark**

ii. **Step 2:** If the firm were operating under perfect competition then P = MR=MC. Hence, the price of its product would be ₦5 **1mark**

TAXATION

Question 2 Solution:

a. Disposable Income = $\frac{\text{income per month}}{1} \times \frac{\text{tax rate}}{100}$

Doctor: $\frac{₦8000}{1} \times \frac{10}{100}$ = **₦800**

Engineer: $\frac{₦7000}{1} \times \frac{12}{100}$ = **₦840**

Civil Servant: $\frac{₦50001}{1} \times \frac{8}{100}$ = **₦900**

Civil Servant: $\frac{₦6000}{1} \times \frac{15}{100}$ = **₦900**

b. The system of taxation employed is known as regressive tax

c. It is regressive tax because higher earners like doctor and engineer were paying lower tax while lower earners like Nurse and Civil servant were paying higher tax. It can then be said that the higher the income, the lower the tax paid, while the lower the income, the higher the tax paid.

Regressive Tax System

From the graph above, we can see that there is a development along the bend from left to right. This implies that those that earn little salary pay more tax than those earning much. The kind of tax system is lopsided because it takes more from the poor than the rich. Due to much tax being levy on the low earners, this is possibility of low savings among this category of people. Also, the low earner will spend more of their income on consumption rather than investment. Besides, the per capita income has been reduced due to high tax being melted out to them. On the other hand, the higher earners who pay little tax are at advantage of doing what the lower earner cannot do. A vivid example of this tax system is poll tax.

APPENDIX X

THE INTERNATIONAL CENTRE FOR EDUCATIONAL EVALUATION (ICEE)
INSTITUTE OF EDUCATION,
UNIVERSITY OF IBADAN

LETTER OF INTRODUCTION TO SCHOOLS

OYO STATE
TEACHING SERVICE

POST PRIMARY SCHOOLS
COMMISSION

OYO ZONAL OFFICE,
Opp. Ajayi Crowther University
Main Gate, Oyo

Your Ref. No.....
All communications on this matter should be addressed to the Chairman Teaching Service Commission quoting:

Our Ref. No.....

4th February, 2019

The Principal,

_____

_____

_____

Sir/Ma,

INTRODUCTION OF A RESEARCH STUDENT

I wish to introduce to you the bearer, **Mr. Oladimeji David O.,** a post-graduate student in the Institute of Education, University of Ibadan, Ibadan, Nigeria.

He is writing his doctoral thesis on the **"Effect of Two Knowledge Approaches on Students' Achievement, Learning and Assessment Attitudes in Quantitative Contents of Economics in Oyo Federal Constituency, Nigeria"** and wishes to collect required data and carry out an experiment with your SS 2 students.

Please permit him access to your school and give him all needed cooperation to ensure the success of the study.

Thank you.

04/02/19

HEAD OF ZONE
TESCOM ZONAL OFFICE

Alhaji Odetunmi, O.T.,
Zonal Head