

**EFFECT OF MULTIMEDIA VIDEO PROJECTION ON UNDERGRADUATE STUDENTS' ACHIEVEMENT AND RETENTION IN QUANTITATIVE ECONOMICS**

BY

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Email: [Michaelonyepunuka1@gmail.com](mailto:Michaelonyepunuka1@gmail.com)**Abstract**

*The purpose of this study is to determine the effect of a multimedia video projection on undergraduates' students' achievement in quantitative Economics. Quasi-experimental design specifying pretest posttest control group design was adopted. The sample size was 65 students made up of 30 male and 35 female students from two purposively selected intact classes. Simple random sampling technique was used to assign the classes, one to control group and the other to experimental group. Three research questions and two null hypotheses were formulated to guide the study. Validated and trial tested Quantitative Economics Achievement Test (QEAT) was used for data collection for both the pretest and posttest while Validated Quantitative Economics Retention Test (QERT) was used for retention test. Mean and standard deviation were used to answer research questions and analysis of covariance used to test the null hypothesis at 0.05 level of significance. The result proved that multimedia projection approach is more efficacious in enhancing students' achievement and retention in quantitative Economics than lecture method. There is no statically significant difference in achievement in Quantitative Economics by male and female students who were taught using multimedia video projection approach. It was recommended that the use of multimedia projection should be encouraged in teaching Quantitative Economics in tertiary institutions and that its use should be popularized through workshops, seminars and conferences.*

**Introduction**

Universities, polytechnics and colleges of education graduate large number of students annually into the labour market for appointments in their respective areas of specializations. But majority of them remain unemployed many years after their

graduation. Researchers and scholars report that employers complain that Nigeria graduates [including Economics graduates] are half baked and poorly prepared for work (Saint, Hatneat & Trasser, 2004; Oluyemi & Adedeji, 2012, Eneogu & Ugwuanyi 2014). Oluyemi and Adedeji further reported that the deficiencies among the graduates are in the areas of entrepreneurial skills, critical thinking, communication, decision making, information technology interpersonal problem solving and self defected skills.

For Economics graduates, the misfit is largely as a result of poor background and academic achievement in quantitative Economics because Quantitative Economics is designed to equip the students with entrepreneurial skills, critical thinking skills, decision making and problem solving skills which are among the skills that researchers discovered lacking among graduates. With the application of the knowledge of Quantitative Economics, rational decisions are made in solving microeconomic and macroeconomic problems. Quantitative economics is the aspect of economics that uses a range of (complex) mathematical and statistical procedures to analyze economic phenomena. They are the techniques that help economic analysts explain economic issues, as well as predict future economic conditions. They also lend quantitative empirical support to economic theories, which are generally expressed in qualitative terms.

Quantitative Economics are econometrics and statistical and/or mathematical aspects of economics. Econometrics combines statistics, mathematics and economic theory to explicitly solve economic problems, thereby avoiding the use of the rule of thumb.

The inability to apply Quantitative Economics skills to solve economic problems is one of the reasons many of the economics graduates are unemployed and many Nigerians, according to Kalu, (2014) are living below poverty line without hope of improvement of their condition even when national endowments abound. This is because, Nigeria as a country has mapped out different development strategies in order to boost employment and to enjoy similar levels of economic, social and industrial growth as developed countries but the employment and enjoyment of similar levels of economic, social and industrial growth as developed countries is a mirage. Even basic economic literacy taught at the secondary school level ought to go beyond personal finance and economic decision making to that of the firms, government and that of the economy as a whole. If economics graduates can apply their Quantitative Economics and the entrepreneurial skills to solve the micro and macro economic problems and the educators properly teach these skills to learners generally, the situation will have positive multiplier effect. That is graduates of Economics who are well equipped with Quantitative Economics skill will not only excel in the labour market helping firms to

make profits and create employment but also stands a good chance of becoming self employed and employers of labour.

Kalu (2014) believed that the reason for high rate of unemployment is that the education system in Nigeria produces job seekers instead of job providers while Eneogu and Ugwuanyi (2014) reported that there is a mismatch between the skills and competencies possessed by the university graduates and the skills and competencies required in the labour market. It has also been observed that many students' achievements in quantitative Economics over the year tend to be very poor. This means that many do graduate without sound knowledge and applications of quantitative techniques in Economics. Skill mismatch in the labour market (Eneogu & Ugwuanyi, 2014) and poor academic achievements (Ekpo, 2006; Madu & Nwangwu, 2014) have been attributed largely to the methods of instruction. The method of instruction that is predominant in Nigeria tertiary institutions is the lecture method (Aroh, 2006; Madu & Nwangwu, 2014). Madu & Nwangwu further stated that lecture method makes learners become discouraged and passive in the class. This is the method whereby teachers communicate ideas to learners by direct verbal discourse sometimes called talk and chalk method. Lecturers use lecture method/ expository strategy reading from text books/notes/computer systems, explaining concepts with little or no contributions from the students, asking and answering few questions and dictating or copying notes on the board for students to copy.

Most Economics lecturers often teach Economics using lecture method. This method is not suitable for teaching Quantitative Economics as majority of the students over the years have developed phobia for almost every aspect of Quantitative Economics because they perceived it difficult to understand and so, try to avoid it by all cost and so undermine its usefulness. Hence many do graduate without good knowledge of Quantitative Economics, with very poor achievement in Quantitative Economics or drop out on the courses that have much to do with Quantitative Economics. All these have been attributed to the method of instruction used by the lecturers.

Poor teaching practice, according to Wange (2017) reinforces the notion of an abstract science out of touch with the modern world. Using this method makes Economics appear so abstract, difficult to retain and to apply in the real world situations and therefore scares many students away from anything that has to do with calculation in Economics.

However, there is a rapid transformation in education sector as a result of rapid advancement in technology which according to Bunfat, Sand, Dahah, Arifin and Zarid (2010) plays an important role in helping teachers to develop their instructions to students. National Open University of Nigeria (2006) defined technology as the

knowledge, tools and systems used by people to make lives easier and better. One of these advanced technologies in the field of teaching and learning is the use of multimedia video projection instructional strategy.

The most cited definition of multimedia is given by Heninch (1997) as the exacting combination of computer hardware and software that allows users to integrate video animation, audio, graphics and text resources to develop effective presentations on an affordable computer. Multimedia technology according to Answer Corporation (2012) is the systematic union of digital video, audio, computers information and communication technologies. Multimedia is a combination of different media to solve a particular problem in a particular field using computer; and can make learning easier (Aroh, 2006; Nwangwu & Obi (2014).

Multimedia video is a very useful means of imparting knowledge because of many different ways in which information can be presented: video, animation, audio, graphic or text (Kolawole, 2012). Visual media also make concepts more accessible to a person than text alone, promote deep learning rather than rote learning and help with later recall (Cowan, 1984, Willingham, 2009). Reddi and Mishra (2003) noted that multimedia technology has always fascinated educationists because of its strength to communicate difficult concepts in simple ways. They all implied that a good instructional approach, such as the use of multimedia video projection has the capability of enhancing academic achievement, interest and retention

Multimedia video projection can be teacher-led or student-generated instruction. In teacher-led multimedia video projection instruction, the teacher takes the position of a facilitator who helps the students to interpret the media content they watch and listen to; while in student-generated multimedia video projection instruction, the student(s) take the place of the instructor and generates the instructional content and helps other students to learn and master the content in the class. This study adopts teacher-led multimedia video projection instruction. According to Carleton (2018), this approach works best when students are adequately informed about what they are expected to learn before presentation so that they will not struggle to make the connection between the learning objectives and the media content. This enables the students to know what they will look for as they watch and listen to the products of multimedia video projection. The researcher in line with Carleton (2018) supports the following ways of using multimedia video projection:

- i. The lecturer presents the media projection after a brief introduction but before the learning and discussion of the concepts or any form of collaborative exercise on the topic so as to give them the image that they can compare to the topics of the lesson.

- ii. The media projection should be presented before and after learning and discussion of the instructional contents. The media presentation after discussion and learning is to help the students to master complex topics, steps or processes in solving any given quantitative or qualitative problem.

In addition to the foregoing recommendation, the researcher includes the following ways of implementing multimedia video projection:

- i. The lecturer reruns the media with occasional punctuations in between to enable the students take down notes of what they heard and watch on the video individually.
- ii. The lecturer divides the class in to four or five mixed intelligence groups of students of different sexes assigning a group leader and secretary to each group
- iii. He/she then prompts the students to discuss what they have heard and watched on the video and thereafter collaborate in solving quantitative economics problems presented by the lecturer and finally, make a group note of the discussion and solution to the given quantitative problems with the instruction that each group leader moderates the groups' discussion and collaboration while the secretary records the group's resolution.
- iv. Each group submits a copy of the group's solutions to the quantitative economics problems on the topic learnt to the lecturer for scoring, recording and feedback.

Multimedia video projection is based on Mayer (2012) 3-cognitive theory of multimedia learning. This theory is based on three cognitive science principles of learning that is based on three assumptions: dual channels assumptions, limited capacity assumptions and active processing assumptions. The tenet is that human information processing system is based on dual channels of verbal/audio and pictorial/visual visual processing and that each channel has limited processing capacity; and that active learning entails carrying out a coordinated set of cognitive processes during learning. The theory specified five cognitive processes: selecting relevant words from the presented text or narration, selecting relevant images from the presented illustrations, organizing relevant words into coherent verbal representation, organizing relevant images into coherent pictorial representation and integrating the verbal and pictorial representations and prior knowledge. The rationale for this theory is that people learn more deeply in words and pictures than on the words alone. This theory can be applied in the design of instructional packages for Quantitative Economics using multimedia video projection but its efficacy in enhancing students' academic achievement and retention in Quantitative Economics in tertiary institutions of learning was not verified by the previous works done in this area.

Academic achievement refers to the knowledge or skills acquired as a result of instruction or training usually measured through standardized test or examination reported in grades or score. It is represented by the grade awarded to students after test/examination following series of teaching and learning between teachers and learners. But for some years now, there has been abysmal academic achievement and performance of students in Quantitative Economics (Agbo, Anurue & Asogwa, 2008; Aduba, Ezeofor & Okoro, 2010; Banwua & Okeke, 2010) and this is largely traced to the method of instruction.

Retention is an individual's ability to remember and recall information, materials and experiences learned over time. This acquired materials in the mind need to be preserved in form of images for knowledge to develop. Okoye (2012) refers to retention as the process of maintaining the availability of new meanings or some part of them. Quantitative Economics contents therefore, need to be presented to the learners in a way or method that touches their sub-consciousness, which can trigger quick recalling of the concepts, processes and skills being taught and learnt.

Retention is an antonym of forgetting. Forgetting represents a decrement in the availability of an acquired meaning that describes the loss in availability that occurs between the original establishment of the meaning and its later reproduction. Retention is seen as a positive aspect of memory while forgetting is seen as the negative aspect. Learning experiences in which the contents and materials are presented in a form that appeal to multiple human senses simultaneously and to encouraged active involvement of students in learning activities have been associated with longer retention this is in line with Okoye (2012) who stated that active participation during instruction increases learning and retention.

In predicting academic achievement and retention some scholars and researchers view gender a relevant factor to be reckoned with while others believe that gender is not a relevant factor. Gender in its narrowest sense means socially constructed sex roles of female or male. Consequently, there might be differences in male and female behaviours, partly as a product or outcome of gender roles orientation in social construction of a particular environment in which they belong to. Gender refers to the social meanings associated with being a male or a female, including the construction of identities, expectations, behaviours and power relationships that is derived from social interactions (Ambe-Uva, Iwuchukwu & Jibrin, 2008; Yang, 2010).

In a study by the U.S Department of Education (2012), boys did slightly better than the girls in mathematics and science. Agomuoh (2010) found that gender influences students' achievement in favour of the male.

Manasaray (2008), documents that girls perform significantly better than the boys. Fagbemi, (2004) and Yawa, (2006) found that male and female students performed equally well in biology using self-instructional Computer-based packages

while Onuoha (2010) is of the view that male and female students perform equally using concept mapping instructional strategy.

The studies by Ogunleye and Babajide (2011) and Agomouh (2010) stated that the use of conventional encourages gender inequalities in science education. Njoku (2010) emphasized that if teachers are made aware of the effects of their classroom practices, including some sarcastic jokes and innuendoes, on their female students, there is no doubt that they would become gender-sensitive” p. 71.

Considering the above literatures, it is clear that the previous works done on multimedia video projection did not verify its efficacy in enhancing students’ academic achievement and retention in quantitative Economics in tertiary institutions in a developing country such as Nigeria and it is not also clear how gender will influence learning when multimedia video projection are used in teaching quantitative economics hence, the investigation of the effect of multimedia video projection on undergraduate students’ achievement and retention in quantitative economics and the inclusion of gender as a mediating variable.

### **Statement of the problem**

In order to improve the academic achievements and overall performances of students, educators continually search for more effective ways to engage their students during teaching and learning process. This is most especially true and indispensable when some lapses have been identified in the education system and when such lapses have been attributed to factors that can directly mar the teaching and learning process and its intended outcome. One of the major factors identified to impart the quality of teaching and learning in this direction is the instructional approaches. Quantitative Economics topics taught mainly in Econometrics, Mathematical and Statistical Economics and also taught in some micro and macroeconomics topics in tertiary institutions in Nigeria seems not to be yielding positive outcomes in the way they are being presented to the learners by the lecturers. In Nigeria tertiary institution of learning, quantitative Economics topics are mainly taught and learnt in the classes using lecture method. According to Ekpo (2006), Aroh (2006), Madu and Nwangwu (2014) poor academic achievements have been attributed largely to predominantly use of lecture method of instruction. Lecture method, according to Madu and Nwangwu, makes learners become discouraged and passives.

Secondly, it has been identified that there is skill mismatch in the labour market causing graduate unemployment in Nigeria (Eneogu and Ugwuanyi, 2014) and that employers complain that Nigeria graduates [including Economics graduates] are half baked and poorly prepared for work (Saint, Hatneat & Trasser, 2004; Oluyemi & Adedeji, 2012, Eneogu & Ugwuanyi 2014). Oluyemi and Adedeji further reported that the deficiencies among the graduates are in the areas of entrepreneurial skills, critical thinking, communication, decision making, information technology interpersonal

problem solving and self-defected skills and that all these are attributed largely to the method of teaching in the tertiary institutions.

For Economics graduates, the misfit is largely as a result of poor background and academic achievement in quantitative Economics because Quantitative Economics is designed to equip the students with entrepreneurial skills, critical thinking skills, decision making and problem-solving skills which are among the skills that researchers discovered lacking among graduates. With the application of the knowledge of Quantitative Economics, rational decisions are made in solving economic problems which includes unemployment problems. Based on this fact, the researchers decided to find out whether multimedia video projection could have positive effect on students' academic achievement and retention in Quantitative Economics topics.

The problem of this study expressed in question form therefore is what is the effect of multimedia video projection on undergraduate students' achievement and retention in quantitative economics?

### **Purpose of the study**

The general purpose of this study was to determine the effect of multimedia video projection on undergraduate students' achievement and retention in quantitative Economics. Specifically, it determined:

1. the mean achievement scores of students taught Quantitative economics using multimedia video projection compared to the use lecture method.
2. the mean achievement scores of male and female students taught Quantitative Economics using multimedia video projection and that of those taught using lecture method.
3. the mean retention scores of students taught Quantitative Economics using multimedia video projection and that of those taught using expository instructional strategy

### **Scope of the study**

The study established the effect of multimedia video projection on undergraduate students' achievement and retention in Quantitative Economics. It also determined the effect on achievement in relation to gender. Topics taught are from third year undergraduate quantitative economics randomly selected from intermediate micro and macroeconomics courses contents. The topics are optimization in production (output optimization and cost minimization using calculus), optimization in consumption (the use of calculus), mathematical logic of the multiplier, and determination of effect of a change in autonomous consumption on national income (mathematical approach). The study covered tertiary institutions in Enugu State, Nigeria.



### **Research Questions**

The following research questions formulated by the researchers guided the study:

1. What are the mean achievement scores of students taught Quantitative Economics using multimedia video projection and that of those taught using lecture method?
2. What are the mean achievement scores of male and female students taught Quantitative Economics using multimedia video projection and that of those taught using lecture method?
3. What are the mean retention scores of students taught Quantitative Economics using Access multimedia video projection and those taught using lecture method?

### **Hypotheses**

The following null hypotheses were formulated by the researchers and tested at 0.05 levels of significance.

Ho<sub>1</sub>: There is no significant difference in the mean achievement scores of students taught Quantitative Economics using multimedia video projection and that of those taught using lecture method.

Ho<sub>2</sub>: There is no significant difference in mean achievement scores of male and female students taught Quantitative Economics using multimedia video projection and that of those taught using lecture method.

### **Methodology**

The study adopted quasi experimental non-equivalent pre-test, post-test control group design, involving two intact groups of one experimental group and one control group. This is in line with Nworgu (2015) who observed that quasi experimental research design is used where random assignment of subjects to experimental and control group is not possible in which case, intact or pre-existing groups are used" (p.88).

The two intact groups used are:

Group I: Multi-media video projection. This group was made up of third year undergraduate Economics students.

Group II: Expository/Conventional strategy. This group was made up of students from of third year undergraduate economics students.

Group	Pre-test	Research condition	Post-test	Retention
Experimental group	O <sub>1</sub>	X or treatment	O <sub>2</sub>	O <sub>3</sub>
Control group	O <sub>1</sub>	- Or control	O <sub>2</sub>	O <sub>3</sub>

Where: O<sub>1</sub> = pre-test;

O<sub>2</sub> = post-test; O<sub>3</sub> = retention

X = Treatment and

- = the subjects receive a placebo treatment

The study was carried out in Enugu State, Nigeria. The choice of this zone is due to the fact that it is one of the commercial areas with various tertiary institutions of learning where economic activities that require rational Economics decisions making are highly required.

The population of the study is one thousand two hundred (1,200) undergraduate students (500 male and 700 females) in degree awarding tertiary institutions in Enugu State, Nigeria. The choice of year three students as the population for the study is because the selected Quantitative Economics are among their course contents.

Two intact classes were sampled for the study using purposive sampling techniques and the sample size based on the number of students in the intact classes is 65 students made up of 30 males and 35 females. Simple random sampling involving balloting with withdrawal and replacement were used for assigning the sampled institutions to control and experimental groups.

Group 1 = Quantitative Economics multi-media video projection

Group 2 = Quantitative Economics lecture method.

Lecture method lesson plans and multi-media video projection guides on Quantitative Economics topics were prepared by the researchers for the instruction. The lesson plans and multimedia video projection guides were face validated by an expert in Economics Education and an expert in measurement and evaluation; both from University of Nigeria, Nsukka.

The main treatment for the study is teaching using the conventional (lecture) method and multi-media video projection guide. To eliminate the Hawthorn effect by possible students faking when a new lecturer is introduced, the regular Quantitative Economics lecturers in the sampled institutions carried out the actual instructional presentation. The lecturer taught the experimental group using multi-media video

projected while every student listens and take down notes based on their observations and thereafter are grouped to discuss the lesson and solve problems. The controlled group was taught the same topics using the conventional approach. In using this approach, the lecturers taught their students solving Quantitative Economics problems on the board while the students just observe, listen and take down notes from the board.

Prior to the commencement of the treatment, the researchers trained each of the lecturers on how to use their respective method to teach quantitative economics. A copy of the validated multi-media video instructional guide and the video package were given to the lecturers of the experimental group while lesson plans for the conventional group were given to the lecturers of the control group.

Quantitative Economics Achievement Test (QEAT) and Quantitative Economics Retention Test) developed by the researchers were used for data collection. Pretest using the validated Quantitative Economics Achievement Test (QEAT) was first administered on the subjects by the researchers themselves and the results carefully recorded before the treatment session, which lasted for four weeks. A day after the treatment, post-tests was administered on the subjects by the researcher using the same QEAT. After two weeks of administering QEAT, the researchers administered the QERT.

Prior to the use of the instruments, face validity was carried out on QEAT and QERT by two experts from University of Nigeria, Nsukka; one from measurement and evaluation, one from department of Economics.

For content validity of the QEAT and QERT, test blue print was used to construct the instrument and was trial tested and the scores analyzed. Responses of students in the upper one-third and lower one-third continuum on the basis of total test scores were compared. Consideration for including an item in the final version of the QEAT was based on the test item satisfying the psychometric quality of having an item discrimination capacity of  $+0.3$  and  $+1.00$ . The ten items constituted the final version of the QEAT and QERT.

The scores pilot-tested QEAT were used to establish the internal consistency of the test items using Kuder-Richardson formula 20 (K-R, 20) method. Thus, an internal estimate of 0.74 was obtained.

Mean and standard were used to answer research questions and analysis of covariance (ANCOVA) was used to test the null hypotheses at 0.05 alpha levels of significance all with the aid of Statistical Package for Social Sciences (SPSS).

## **Results**

The results are presented according to the research questions and hypotheses.

**Research question 1:** What are the mean achievement scores of students taught Quantitative economics using multimedia video projection and that of those taught using expository instructional strategy?

**Table 1:** mean achievements and standard deviations scores of students in Quantitative Economics

Groups	Pre-test		Post-test		Mean n	Retention Test		Mean n	N
	$\bar{X}$	S D	$\bar{X}$	S D		$\bar{X}$	S D		
Multi-media video projection	27.07	4.353	75.74	5.035	48.65	70.41	5.833	5.33	27
Expository/Lecture	24.24	4.951	49.83	8.888	25.59	37.68	7.568	12.15	38

Table 1 shows that the experimental group has a pre-test mean score of 27.07, a post-test mean score of 75.74 and mean gain of 48.65 while the control group has a pre-test mean score of 24.24, a post-test mean score of 49.83 and mean gain of 25.59. The experimental group has a higher mean gain than control group. This shows that the group taught Quantitative Economics topics using Multi-media video projection has a higher achievement score than the group taught using lecture method.

**Research question 2:** What are the mean achievement scores of male and female students taught Quantitative Economics using multimedia video projection and that of those taught using expository instructional strategy?

**Table 2:** mean achievement scores of male and female students taught Quantitative Economics using multimedia video projection

Groups	Pretest		Posttest		Mean Gain	N
	$\bar{X}$	S.D	$\bar{X}$	S.D		
Male	26.57	4.76	63.60	12.403	37.03	30
Female	24.43	4.867	58.00	16.469	33.57	35

Table 2 shows that male students have a pre-test mean score of 26.57, a post-test mean score of 63.60 and mean gain of 37.03 while female students have a pre-test mean score of 24.43, a post-test mean score of 58.00 and mean gain of 33.57. Male students have a higher mean gain than the female students. This shows that male students taught Quantitative Economics using multi-media video projection achieved higher than their female counterparts.

**Research question 3:** What are the mean retention scores of students taught Quantitative Economics using multimedia video projection and that of those taught using expository instructional strategy?

Table 1 also shows that the experimental group has posttest mean score of 75.74, retention mean score of 70.41 and mean loss of 5.33, while the control group has posttest mean score of 49.83, retention mean score of 37.68 and mean lost of 12.15. The experimental group has less retention mean loss compared to control group. This shows that the group taught Quantitative Economics topics using multi-media video projection has higher retention of the lessons more than those taught using expository instructional strategy.

### Test of Hypotheses

Ho<sub>1</sub>: There is no significant difference in the mean achievement scores of students taught Quantitative Economics using multimedia video projection and that of those taught using expository instructional strategy.

**Table 4:** Analysis of co-variance (ANCOVA) of students' posttest achievement scores in Quantitative Economics – multimedia video projection, expository method and gender

	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Post-test	13019.756 <sup>a</sup>	5	2603.951	131.307	.000
Intercept	Post-test	2952.298	1	2952.298	148.873	.000
Pretest	Post-test	940.999	1	940.999	47.451	.000
Gender	Post-test	8.317	1	8.317	.419	.520
Group	Post-test	1274.604	1	1274.604	64.273	.000
Gender * Group	Post-test	8.884	1	8.884	.448	.506
Error	Post-test	1170.029	59	19.831		
Total	Post-test	252772.000	65			
Corrected Total	Post-test	14189.785	64			

Significant at 0.05 levels

The results shown in table 4 indicate that treatment has direct effect on students' achievement in Quantitative Economics. This is because the F-value at 64.273 in respect of treatment main effect is shown to be significant at .000. This, therefore, shows that at 0.05 level of significant, the F-value of 64.237 is significant. Therefore, it can be concluded that the research null hypothesis 1 is rejected. The observed difference between the mean scores of students taught some Quantitative Economics topics using multi-media projection and those taught using expository strategy is significant and not by chance.

**Ho<sub>2</sub>:** There is no significant difference in mean achievement scores of male and female students taught Quantitative Economics using multimedia video projection and that of those taught using expository instructional strategy.

Table 4 also shows that the difference in the mean achievement scores of male and female students taught using multi-media video projection is not significant since the F-value at 0.448 in respect of treatment main effect is not significant at 0.506. This, therefore, shows that at 0.05 level of significant, the F-value of 0.448 is not significant. The observed difference in achievement scores of between the two gender groups is merely due to chance. The research hypothesis is therefore accepted. There is no significant difference in mean achievement scores of male and female students taught some quantitative economics topics using multi-media video projection.

### **Discussion of findings**

The findings show that that multi-media video projection yielded a significant difference on students' achievement in Quantitative Economics than the conventional expository instructional strategy. This is in line with Aroh (2006), Nwangwu and Obi (2014) and Kolawole (2012) who observed that multi-media video package is more learner-centered and makes learners more active than the conventional lecture approach. The students can learn Quantitative Economics topics better when they are actively involved and when the lesson appeal to varieties of their senses.

Therefore the perceived abstract nature of Economics which contributes to students' perception of most of the Quantitative Economics topics can be remedy using multi-media video projection to teach the contents.

The findings also revealed that gender as a variable had no significant effects on students' achievement in Quantitative Economics. This is in line with Anoh (2006) found that male and female students performed equally well in biology using self-instructional Computer-based packages and Onuoha (2010) who found that male and female students perform equally using concept mapping instructional strategy but not in line with Manssary (2008) who discovered that female students achieved higher in Biology than the male students when exposed to treatment. This difference could be as

a result of the differences in instructional approach used in the reviewed work and multi-media video projection and differences in methods of data analysis.

## Conclusion

Multi-media video projection proved efficacious in enhancing undergraduate students' achievement in Quantitative Economics. This means that in an effort to promote high economic achievement and retention in tertiary institutions in developing countries, Quantitative Economics topics should be taught using multi-media video projection. The conventional (expository) instructional strategy had been proved to be ineffective in enhancing students' achievement in Quantitative Economics. Gender is not an important factor in determining the instructional approach to be adopted in teaching Quantitative Economics. This is confirmed by the available data that the teaching strategy has similar or equally effects on students' achievement in Quantitative Economics irrespective of their gender.

## Recommendations

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

1. Economics lecturers should adopt multi-media video approach in teaching Quantitative Economics and lecturers should be motivated to integrate multimedia approaches in their classes.
2. The school authorities should equip their institutions with the state-of-the-art multi-media facilities such as computers, up-to-date multimedia software, DVD, VCD etc. and ensure regular electricity power supply.
3. Enlightenment campaign, seminars, workshop and conferences for use of multi-media packages in teaching and learning should be organized by faculties, schools and professional associations.

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