Effects of computer graphics and animation instructional modes on Junior Secondary Students' learning outcomes in business studies in Ibadan, Nigeria

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Abstract

The study investigated the effects of computer graphics and animation instructional modes on students' achievement in Business Studies. The study adopted a pretest-posttest control group quasi-experimental design. Schools in Ibadan were clustered along the two existing educational zones. From each zone, two Local Government Areas (LGAs) from Ibadan city and one LGA from Ibadan less city were randomly selected. Purposive sampling technique (based on schools that had functional computers) was adopted in selecting three public junior secondary schools in each LGA, totaling nine schools. Thirty junior secondary students in each of the schools were randomly selected making a total of 270 students. The instruments used were: Business Studies Achievement Test (r =0.86) and Business Studies Self-Efficacy Questionnaire (r = 0.82). Three hypotheses were tested at p = ≤0.05. Data were analysed using ANCOVA. There was a significant main effect of treatment on students' achievement in Business Studies ($F_{(2,257)} = 137.78$, $\eta^2 = 0.52$). The result shows that students who had high self- efficacy did better than students who had low self-efficacy in the tests. Furthermore, there was a 2-way significant interaction effect of treatment and self-efficacy ($F_{(2,257)} = 7.03$, $\eta^2 = 0.05$) on students' achievement in Business Studies. Therefore, computer graphics and animation instructional modes improved students' achievement in Business Studies. Self-efficacy is also a factor in students' achievement. It was recommended that teachers should use computer graphics and animation instructional mode to improve the teaching of ICT aspect of Business Studies.

***Keywords**: Computer Graphics Instructional Mode, Computer Animation Instructional Mode, Students' Achievement in Business Studies and Self-Efficacy.*

Introduction

In this age of technological advancement, the world has witnessed a revolution in the way and manner things are done. The tremendous development witnessed in technology has made it possible for our daily activities to be easy and faster. This includes the aspects of communication, e-banking, e-commerce, e-learning among others. The dynamics of the present technological age has created a completely new world of interaction and learning. In view of this, every country of the world is embracing new technologies in order to have a sense of belonging and be relevant technologically. Indeed, technology has become vital in professional fields like medicine, commerce, and industry, entertainment, and education among other areas.

In the present century, an inspiring and entrancing tactic has to be stimulated to assist students to learn effectively, comprehend and review ideas and make contributions for future development. In this regard, out of auspicious tactics, as indicated by Mayer, Dow & Mayer (2003) and Adegoke (2010) includes multimedia display bolstered in visual and verbal arrangements complemented with pictures, animations, texts, and narrations. Media refers to the system used to present instruction, such as a book-based medium, video-based medium or a computer-based medium, while, mode means the method employed to teach, such as words (verbal) versus pictures (non-verbal). Modality means the information processing channel, which is employed by the students to comprehend the information, such as auditory versus visual (David, 2015).

This study focused on how combinations of modes and modalities may affect students' learning outcomes; for instance, how visual-verbal material (i.e., text) or auditory-verbal material (i.e., narration) is merged with visual-non-verbal materials (i.e., graphics, video or animations). In this study, the mode is grouped into three namely; view mode, trial mode and test mode. The view mode is meant for students to observe the teaching package instruction, the trial mode is for students to practise what they have observed or seen in the view mode and the test mode is for students to assess themselves as well as the teachers assessing the students. The instructional process carried out with the help of the computer is known as Computer Assisted Instruction (CAI) The use of (CAI) is an interactive instructional method whereby a computer is used to present instructional materials and evaluate the learning that occurs. By introducing Information and Communication Technology (ICT) into schools, students can be better prepared for adult life. If the technology helps students learn, then they may be able to catch up with students in other countries. According to Yusuf & Afolabi (2010), the use of computer-assisted instruction (CAI) is a supplement to conventional method which produced higher achievements by the learners than using conventional method alone. Akinola & Adodo (2002) indicated that computer-assisted instruction is a process by which students learn fast. The purpose of CAI for students is to promote necessary progress and provide a solution to the problems of teaching and learning process. Indeed, CAI provides immediate feedback, for students to know whether their answer is correct or not. It also offers different types of activities and a change of pace from teacher to group instructions. However, subjects that consist of skills such as Business Studies should be taught practically using computer as it is stipulated in the curriculum.

Business Studies is now one of the compulsory subjects which students in the junior secondary school offer. Business Studies is a basic subject that may assist students to acquire more aptitudes which are normal and fundamental to all close personal and occupational exercises (Adeyemo, 2013). Business activities influence the everyday living of all citizens as they work, spend, invest, travel and play. It impacts occupations, salaries and open doors for the individual venture. It has a vital impact on the way of life and personal satisfaction of individuals, and on nature in which they live and which future ages can acquire (Ekanem, 2008). It seems Business Studies has not been properly implemented in Nigerian secondary schools because of the bias against vocational education.

Business Studies is a commercial subject that formed the essential foundation in the Junior Secondary School system in Nigeria. Okonkwo cited in Wosu (2016) viewed Business Studies as the bedrock of technology. Business Studies is one of the aspects of vocational education which provides people with the essential skills and theoretical knowledge needed for performance in the business world either for government employment or for self-employment. The Federal Republic of Nigeria(FRN) (2004) emphasised the inclusion of vocational and technical education subjects in the curriculum in order to make the recipients immediately employable or self-reliant on leaving school. To this end, the secondary school system is presented in two stages, namely the Junior Secondary School (JSS) and the Senior Secondary School (SSS).

However, the broad goals of the secondary education are (a) the preparation of the students for useful living in the society and (b) the preparation of students for higher education. Under the senior secondary system of education, the following business subjects are offered: Typewriting, Shorthand, Book-keeping, and Financial Accounting, Office Practice, Commerce, Computer and Economics. The components of business studies include Typewriting, Shorthand, Book-keeping, Office Practice, Computer and Commerce which are offered at the junior secondary school level.
Business Studies consists of skill and non-skill subjects. The Comparative Education Study and Adaptation Center (CESAC) reviewed in 2001 itemized the goals of Business Studies as follows:

i. to help the student to procure the

fundamental information of Business Studies;

ii. to improve the essential abilities in office occupations;
iii. to help student for further training in Business Studies;
iv. to give an introduction and essential abilities with which to begin a real existence of work for the individuals who may not experience further training;
v. to offer essential abilities for individual use later on;
vi. to impart the information and abilities to the national economy

However, Business Studies includes a number of skills such as keyboarding as a communication tool, computer skills in business studies, typewriting skills, but this study focused on keyboarding as a communication tool such as page set-up, techniques development in keyboarding, paragraphing, printers' correction signs and marks, ledger entries which can only be taught and developed systematically. Students' poor performance in Business Studies at present may be related to the fact that they are not taught with the appropriate teaching methods and instructional aids. Even the skills aspect which is supposed to be taught practically, are being taught within the four corners of the classrooms theoretically. Wosu (2016) affirmed that the performance of students in Junior Secondary Certificate Examination Business Studies has been declining, the students' attitude towards Business Studies tends to be negative and most of the Business Studies teachers have been inadequate and ill-prepared for the teaching of Business Studies. Therefore, the application of appropriate teaching method is crucial to successful teaching and learning of the subject. As a matter of fact, Alio and Harbour (2000) claimed that the instructional strategy employed by the teacher influences the cognitive and affective outcomes of students.

The conventional method is teacher-centered with little or no participation of students; consequently, they remain passive listeners (Joshi, 2008). This method as observed by Babawale (2013) is popularly known as talk-and-chalk method. This implies that the teacher could sometimes, if he wishes, write on the chalkboard as he talks, explaining and summarising his lesson. As a result, the students' involvement and participation are very low because communication is often one way for most of the time in the teaching process. The conventional method will not be effective for teaching Business Studies especially the practical skill aspect of the subject since it does not arouse participatory learning, hence dearth retentive quality. Therefore, in order to alleviate the problem of the teaching of Business Studies concepts, the use of lecture method complemented with computer graphics and lecture method complemented with computer animation could be innovative instructional strategies.

Sangodoyin (2011) affirmed that computer graphics and animation instructional modes should be used to teach Biology and other subjects, in which Business Studies could be one of the subjects. Also, Owolabi and Oginni (2014) ascertained that there is a significant difference in the performance of students exposed to cartoon animation than their counterparts exposed to lecture method only.

Computer graphics and animation are sub-categories in educational technology. Computer graphics is the creation, storage, and manipulation of colors, drawings, and pictures with the aid of a computer system (Anna, 2015). They are produced from by an extensive range of rendering software. Chen, Shi & Xuan (2007) opined that due to innovation in the rendering method, computer graphics designs show up so practical that it might be utilized as a convincing type of photographic picture falsification. The most popular graphics software packages used for graphics instructional modes are CorelDraw, Microsoft power point and computer-aided design (CADs).

According to Sangodoyin (2011), the graphics presentation modes are designed to help teachers produce high-quality learning packages, concepts, and ideas or lesson plan that are interesting to learners and effective in its ability to convey teacher's message.

Therefore, this study used Microsoft powerpoint, Corel draws and Snagit for the software package to teach the selected topics.

On the other hand, animation refers to life in graphics. It is a motion-picture shown by employing a series of drawings, images of objects that are slightly completely different from each other which once viewed quickly, one after another form the look of movement (Pilling, 1992). Literally, animation is moving something (text and image) that cannot move by itself. Mayer and Moreno (2002) allude to animation as a mimicked film portraying development of drawn (or replicated) objects or as an image in motion. According to Sanchez, Canas, & Novak, (2010), educational animations are animations made for the precise purpose of nurturing learning. The recognition of exploitation of animations assists students to perceive and bear in mind that information has significantly improved since the appearance of powerful graphics-oriented computers. Thus, teachers are not any longer restricted looking forward to static graphics however will without delay convert them to into educational animations (Pilling, 1997).

Animation teaching might be in form of lesson presentation, such that, still pictures; content, designs, motion pictures, foundation sound, as well as some narrations are being consolidated at a proportional time in order to fortify students' comprehension of thoughts. The adaptability of learning through animation permits more extensive stimuli accordingly expands the students' dynamic participation in learning Hoffler & Leutner (2007) studied the effect of instructional animation versus static pictures and found out that animation presentation is superior over static picture presentation. The study of Gokhan (2013) found that computer animation method is more effective than conventional teaching methods in terms of improving students' achievement. Likewise, Yisa (2014) found that the performance of students taught with animation instructional package was better than their counterpart taught with the conventional method. This study used Microsoft power point, Corel draw, Flash and Adobe captivate to develop software package used to teach the selected topics for the study.

Self-efficacy refers to as trust in one's ability and actualizing the intellectual, conduct, or social aptitudes vital for the successful performance of a task (Zimmerman, 2000). Ormrod (2006) refers to self-efficacy as the belief that one is capable of performing in a certain way to achieve definite goals. According to Olayemi (2006), self-efficacy has a great influence on the choice people make and their actions to accomplish a specific task. It is a person's perception of him or her to plan for and to take action to reach a particular goal. Studies have been carried out on self-efficacy as it relates to achievement. Ilori (2004) investigated the relationship between self-efficacy and academic achievement among secondary school students. The result of the findings showed that there was no significant relationship between self-efficacy and academic achievement of secondary school students. Durowoju (2014) found no significant effect of self-efficacy on students' achievement in Commerce

However, it is imperative that a study to verify the above variable on learning outcomes in Business Studies be undertaken. Therefore, this study found out whether self-efficacy in any way has influence on the use of computer graphics and animation instructional modes in teaching Business Studies in junior secondary schools.

Statement of the Problem

Business studies occupy a fundamental position in Nigeria's move towards an industrial breakthrough, as the subject is a vocational subject currently taught in junior secondary schools in the country. However, the current method of teaching the subject in school that is the traditional method is inadequate this digital era. Business Studies curriculum for Junior Secondary School specifies that the skill aspects (paragraphing, techniques development in keyboarding, page set-up, printers' correction signs and marks) should be taught practically, using a computer. It is however observed that the skills aspect of the subject is presently taught theoretically in the schools and also examined theoretically without the use of computers. Such shortcoming leaves secondary school graduates ill-equipped for work life.

In addition, students' performance in Business Studies is not encouraging. A number of studies have been carried out by researchers in an attempt to identify what may be responsible for students' poor performance and poor acquisition of skills in the subject. Many of these studies looked at school, teachers, students, class-size and home as factors that may be hindering teaching and learning of the subject. But it seems none of these studies has addressed the issue of instructional strategies, especially as it relates to the use of computer graphics and animation instructional modes on Junior Secondary School II (J.S.S 2) learning outcomes in Business studies in South West, Nigeria. Therefore, this study found out whether self-efficacy influence computer graphics and animation instructional modes on learning outcomes in Business Studies in Ibadan.

Hypotheses

The study tested the following three hypotheses at 0.05 level of significance.

H_{o1} There is no significant main effect of treatment (Computer graphics and animation instructional modes) on students' achievement in Business Studies.

H_{O2} There is no significant main effect of self-efficacy on students' achievement in Business Studies.

H_{O3} There is no significant interaction effect of treatment (Computer graphics and animation instructional modes) and self-efficacy on students' achievement in Business Studies.

Methodology, Population, Sampling Technique and Sample

This study adopted a pretest-posttest, control group and quasi-experimental design. The population of this study comprised all Junior Secondary School 2 students and their teachers in public schools in Ibadan, Oyo state. Nine public schools were purposively selected from the three local government areas in Ibadan. The nine schools that participated in the experimental study;

i. had at least ten functioning computers system with a standby generator each;
ii. had poor performance in Business Studies for the past ten years;
iii. were co-educational and;
iv. were far from one another in terms of distance to avoid undue interaction among the participants of one school and the other.

The selected schools were randomly assigned to each of the treatment. That is, three schools were assigned to each of the groups (Computer graphics instructional modes, computer animations instructional modes and conventional lecture method of teaching). Lastly, in each of the schools that were selected, simple random sampling technique was adopted to select an arm of JS II. The class was chosen because the class had covered a large proportion of the Junior Secondary School's Business Studies curriculum thereby having sufficient knowledge in Business Studies. Also, simple random sampling technique was employed to select thirty JSS2 students from each of the nine selected schools making a total of two hundred and seventy students.

Business Studies Achievement Test (BSAT)

Business Studies Achievement Test (BSAT) was used in the study for the purpose of data collection. BSAT was developed by the researchers to measure the achievement of the students using a table of specification. It consisted of two sections, A and B. Section A had information on students' personal profile such as name school, class, and gender. Section B had forty multiple choice items. The contents of the topic were picked as indicated in JSS 2 Business Studies syllabus. The generated items were given to expert in Business Studies as well as experienced secondary school Business teachers for vetting.

The contents areas covered techniques development in keyboarding, paragraphing, page set-up, printers' correction signs and ledger entries. The pilot testing was done by administering the items to a randomly selected

60 J.S.S.2 students who did not take in the study. The reliability of the items of the test was established using Kuder-Richardson Formula (KR_{20}) which yielded a reliability coefficient of 0.86. Items with the discrimination index above 0.3 and difficulty level indices between 0.40 and 0.60 were included in the final test. The result of item analysis helped to reduce the number of items from eighty (80) to forty (40). BSAT was dichotomously scored. 1 mark was assigned to a correct response, while 0 was assigned to a wrong response.

Business Studies Self-Efficacy Questionnaire (BSSEQ)

This questionnaire was developed by the researcher with the assistance of some lecturers in the Institute of Education to determine the extent to which students' academic self-efficacy determined achievement. It consisted of two sections: A and B. Section A was on biodata of the students, name, and name of school while section B contained twenty (20) items. The respondents responded along with 4-point Likert scale response options, Very True of Me (VTM), True of Me (TM), Fairly True of Me (FTM), Not True of Me (NTM). The BSSEQ was trial tested using 100 J.S.S.2 students who did not take part in the study to establish the psychometric property of the instrument. The result of the items analysis helped to reduce the items to twenty (20). Cronbach Alpha was used to establish internal consistency and reliability coefficient of BSSEQ. The reliability of the instrument was found to be 0.82. Each of the positive items was scored as follows: 4,3,2, and 1 for Very True of Me, True of Me, Fairly True of Me, Not True of Me. Negative items were reversed in the opposite way.

Treatment and Procedure

Two treatment packages were prepared by the researcher as a guide for the research assistants (Business Studies teachers) that participated in the study. The nine selected schools were assigned to treatment and control groups. The pre-test was administered to participants before the treatment. The two groups were exposed to t reatment after which post- test was administered on them.

This refers to the instructional package guide for the research assistants (Business Studies teachers) that participated in the study. Computer Graphics Instructional Package (CGIP) and Computer Animation Instructional Package (CAIP) consisted of five topics in business studies: Techniques development in keyboarding; Paragraphing; Page set-up; Ledger entries; and Printers' correction signs. The necessity for researcher-made computer package was based on the fact that the commercially produced computer graphics andanimation packages were not common. Even, if they were available, they may not be directly relevant to the topics and the objectives to be achieved in this study. As a result of this, developing a computer packages for use by the researcher was inevitable. This was packaged by the researcher in line with suggestions and contributions of experienced computer graphics and animation designers, lecturers in educational technology as well as experts in the field of research.

Computer Graphics Instructional Guide (CGIG)

Computer Graphics Instructional Guide was designed by the researcher to serve as a guide for research assistants in the Experimental Group I. The instrument was given to experts in the field of evaluation, in the field of educational technology as well as some experienced Business Studies teachers for constructive criticism. This was later trial tested on 30 students, who did not participate in the study to see the work ability of the instrument.

Computer Animation Instructional Guide (CAIG)

Computer animation instructional guide was designed to serve as a guide to the research assistants in computer animation group. The instrument was subjected to scrutiny and constructive criticism by research experts as well as seasoned Business Studies teachers. The instrument was trial tested on 30 students who were not part of the study to establish its

appropriateness.

Conventional Method Instructional Guide (CMIG)

Conventional method instructional guide was written by the researcher based on the prevailing conventional methods of teaching in schools. Students in this group were not exposed to any treatment (computer graphics and animation instructional modes) packages. The students were given tasks to carry out in the form of class work exercises and homework just as those who were in the treatment groups.

Data Analysis

The study adopted the Analysis of Covariance (ANCOVA) to analyze the data collected. This is to test for the significant differences between group mean and to control for the effect of covariates.

Results

Hypothesis 1: There is no significant main effect of treatment (computer graphics and

Table 1: Analysis of Covariance (ANCOVA) of Effects of Treatment, and Self efficacy on Students' Achievement in Business Studies.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	6764.854	12	563.738	35.975	.000	.627
Intercept	8261.571	1	8261.571	527.206	.000	.672
Pre-Achievement Test	15.469	1	15.469	.987	.321	.004
Main Effects:						
Treatment	4318.329	2	2159.164	137.785	.000	.517
Interest	195.562	1	195.562	12.480	.000	.046
Self-Efficacy	51.801	1	51.801	3.306	.070	.013
2-Way Interactions Effect						
Treatment*Interest	33.774	2	16.887	1.078	.342	.008
Treatment * Self-Efficacy	220.390	2	110.195	7.032	.001	.052
Interest * Self-Efficacy	.354	1	.354	.023	.881	.000
3-Way Interactions Effect						
Treatment * Interest * Self-Efficacy	129.688	2	64.844	4.138	.017	.031
Error	4027.312	257	15.670			
Total	184833.000	270				
Corrected Total	10792.167	269				

a. R Squared = .627 (Adjusted R Squared = .609)

Table 1 reveals that after adjustment for the covariate, there is a significant main of treatment on students' achievement in Business Studies, $F_{(2,257)} = 137.785$, $p < 0.05$). The hypothesis which stated that there is no significant main effect of treatment on students' achievement in Business Studies was rejected. The partial eta squared estimate was 0.517. This implies that 51.7% of the variance observed in the achievement test was due to treatment.

Table 2: Estimated Marginal means of Students' Achievement in Business Studies by Treatment.

Treatment	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Graphics	25.197[a]	.545	24.125	26.269
Animation	30.641[a]	.456	29.743	31.538
Control	19.480[a]	.492	18.510	20.450

Table 2 shows that students in experimental group II (Animation Instructional Mode) had the highest mean score of ($\bar{x}$= 25.197 while, the control group had the mean score $\bar{x}$=19.480

Hypothesis 2: There is no significant main effect of self-efficacy on Junior Secondary two achievement in Business Studies.

Table 1 indicates that there was no significant main effect of self-efficacy on Junior Secondary two students in Business Studies, $F_{(1,257)}$ =3.306; p>0.05. Consequently, the null hypothesis that stated that there is no significant main effect of self-efficacy on junior secondary two in achievement was not rejected.

Table 3: Marginal Means of Students' Achievement by Self-efficacy in Business Studies

Self –efficacy	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Low	24.591[a]	.392	23.820	25.367
High	25.620[a]	.408	24.818	26.423

Table 3 presented the marginal means of students' achievement in Business Studies by self-efficacy. It indicated that students with high self-efficacy had the higher mean score of $\bar{x}$= 25.620 while students with low self-efficacy had the lower mean score of $\bar{x}$= 24.591, $\bar{x}$= 30.641, followed by students in experimental group I (Graphics Instructional modes) with the means score of $\bar{x}$ = 25.197 The difference in their mean score was statistically significant.

Hypothesis 3: There is no significant interaction effect of treatment and self-efficacy on students' achievement in Business Studies.

Table 1 shows that there was a significant interaction effect of treatment and self-efficacy on students' achievement in Business Studies, $F_{(2,257)}$ = 7.032; p<0.05. The null hypothesis that stated that there is no significant interaction effect of treatment and self-efficacy on students' achievement in Business Studies was therefore rejected.

Table 4: Marginal Mean of Students' Achievement in Business Studies by Treatment and Self-Efficacy

Treatment	Self-efficacy	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Graphics Instructional Mode	Low	25.784[a]	.527	24.747	26.822
	High	24.610[a]	.944	22.751	26.468
Animation Instructional Mode	Low	28.757[a]	.710	27.359	30.155
	High	32.524[a]	.538	31.464	33.585
Conventional Method	Low	19.233[a]	.789	17.680	20.786
	High	19.727[a]	.590	18.565	20.889

Table 4 shows that students with low self-efficacy in the animation instructional mode had the highest mean score ($\bar{x}$= 28.757) in achievement in Business Studies; followed by students with low self-efficacy in the graphics instructional mode with the mean score ($\bar{x}$= 25.784), while students with low self-efficacy in the conventional teaching method had the lowest

mean score ($\bar{x}$= 19.233). In addition, Table 4 indicated that students with high self-efficacy in the animation mode had the highest mean score ($\bar{x}$=32.524) in achievement in Business Studies; followed by students with high self-efficacy in the graphics instructional mode with the mean score ($\bar{x}$= 24.610), but the students with high self-efficacy in the conventional teaching method had the lowest score of mean ($\bar{x}$=19.727). The difference in their mean was statistically significant.

In order to examine the nature of interaction, a line graph was constructed to disentangle the interaction as shown in Fig. 1

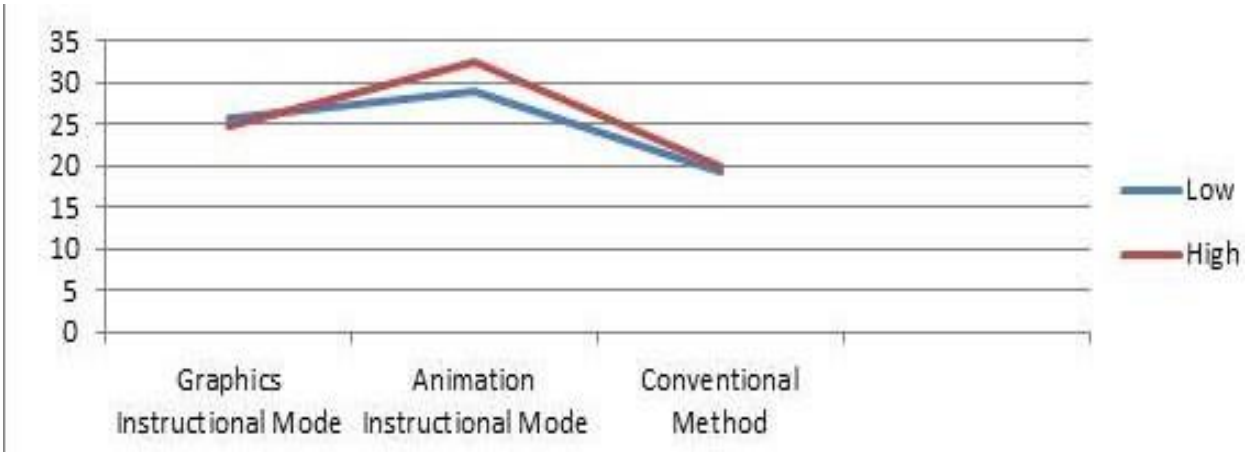

Fig. 1: Interaction Effect of Treatment (Computer Graphics and Animation Instructional Modes) and Self-Efficacy on Students' Achievement in Business Studies.

Fig. 1: shows that students that have low self-efficacy (25.784) performed better than students that have high self-efficacy (24.610) using graphics instructional mode, but for students who have high self-efficacy (32.524) performed better than students that have low self-efficacy (28.757) in animation instructional mode. In similar vein, students in conventional method (control group) that have high self-efficacy (19.727) performed better than students who have low self-efficacy (19.233). Observing the interaction critically, one can conclude that the statistical difference was stronger with students who were taught with animation instructional mode, while those who were taught with conventional method had the least mean scores, with the students with high self-efficacy obtaining higher mean score (19.727) than students with low self-efficacy (19.233).

Discussions

The result showed that there was a significant main effect of treatment (computer graphics and computer animation) on junior secondary students' achievement in Business Studies. The result clearly showed the potency of animation and graphics groups over the conventional teaching method. This might be as a result of the effectiveness of the teaching methods that were introduced, which allowed students to comprehend the information through diagrams in motion provided by visual stimuli. Also, the orientation given to students before the treatment might have contributed significantly to their performance. Furthermore, the conducive environment filled with real-life objects (animated and graphics) to learn which might have influenced their materials. This is in support of Hoffler & Leutner (2007) who studied the effect of instructional animation versus static pictures and found out that the meta-analysis revealed that animation is superior over static picture presentation.

This study agrees with the study of Gokhan (2013) who discovered that computer animation method is more effective than conventional teaching methods in terms of improving students' achievement. Moreso, the study is in consonance with the findings of Sangodoyin (2011) who found out that there is a significant main effect of treatment (computer graphics and animation) on students' achievement in Biology. The finding is in support of Yisa (2014) who

discovered that the performance of students taught with computer animation instructional package was statistically higher than those taught with the conventional method and that the computer animation was effective in improving students' achievement. The difference is in favor of students exposed to the treatment. However, the findings of this study contradict the results of Haselden (2011) who indicated that traditional teaching was more effective.

The result indicated that there was no significant main effect of self-efficacy on junior secondary school students' achievement in Business Studies. This means that self-efficacy of students irrespective of the level (high or low) does not in any way affect their academic performance. In other words, whether the self-efficacy of students is high or low, their achievement in Business Studies is not likely to be affected if any of the teaching methods are used by Business Studies teacher. Thus, self-efficacy is not a factor to be considered in the improvement of students' achievement in Business Studies. The findings of this study confirm the study of Durowoju (2014) that found no significant effect of self-efficacy on students' academic achievement of secondary school students.

On the other hand, this finding contradicts the studies of Tenaw (2013) that found a significant effect of self-efficacy on students' achievement

in Analytical Chemistry. Also, most of the researchers employed survey design as against experimental design adopted in this study. Furthermore, other factors aside self-efficacy

could have contributed to the academics' achievement of students. The finding indicated that there was no significant interaction effect of treatment and self-efficacy on students' achievement in Business Studies. This means that treatment and self-efficacy jointly had no influence on students' achievement in Business Studies. The interaction effect of treatment and self-efficacy accounted for less than one percent of the variance observed in students' achievement in Business Studies.

The study earlier showed that the main effect of treatment was significant on students' achievement in Business Studies. It may mean that when taken both the treatment and self-efficacy interacted together, the effect that treatment had on students' achievement is overcome by that of self-efficacy. Another reason adduced to this result is that the sampling techniques used in the study did not consider the disparity in the level of students' self-efficacy whether high or low, that is students were randomly assigned to treatment group without prejudice to their level of self-efficacy. This may seem to be why the interaction effect of treatment and self-efficacy did not produce a significant effect on students' achievement in Business Studies. Students tend to enjoy equal benefits when given an equal opportunity to learn without being biased.

The findings of this study are in consonance with Bates and Khasawneh (2007) who investigated the influence of a partially mediated model on the perception of self-efficacy in online learning, indicated that the successes the students obtained in the past in online contexts influence their self-efficacy. The finding of the study is also in agreement with the study of Durowoju (2014) that showed that the combination of continuous assessment modes and self-efficacy had no significant effect on students' achievement in Commerce. However, the study contradicts that of Akujieze (2013) who investigated the effect of out of class activity and counseling strategies on learning outcomes in geometry among low-achieving senior secondary students and self-efficacy, found a

significant effect of self-efficacy on students' achievement.

Conclusion

The result of this study provides empirical evidence that there is a significant main effect of computer graphics and animation instructional modes on students' learning outcomes in Business Studies. This is an indication that students perform better when the appropriate teaching method is used to teach. Animation instructional model is a teaching method which gives a good way of getting bright ideas and helps learners perform better in Business studies. The result showed that those who are exposed to conventional teaching method had a lower mean score in learning outcome in Business Studies.

Recommendations

The study recommends that:

i. curriculum planners should ensure that the skills aspect of Business Studies as specified in the curriculum to be taught practically especially with the use of computers
ii. government should organise seminars, workshop and conferences for teachers to enlighten them on these teaching methods.
iii. there should be adequate provision of computers and computer rooms in schools, to enhance the effective delivery of instructions.

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