



SPECIAL VIDEO INSTRUCTION AND SENIOR SECONDARY SCHOOL STUDENTS' ANXIETY TOWARDS MENSURATION IN GWAGWALADA, NIGERIA

Jekayinfa, Olatunji Jamesⁱ,

Owonuwa, Seun

National Mathematical Centre,

Abuja, Nigeria

Abstract:

This study investigated the effects of special video instruction on senior secondary school students' anxiety towards mensuration in Gwagwalada, Nigeria. It employed a quasi-experimental design of pre-test post-test non-randomized and non-equivalent control group design type. The population of the study comprised all senior secondary school 1 students in Gwagwalada area council. Three-stage sampling technique was applied to select two equivalent schools, assign the schools to experimental and control groups and eventually select one intact class from each of the two groups, the students of which formed the samples for the study. A total of 133 students participated in the study comprising 74 and 59 students in the Experimental group and control group respectively. Three research questions and three corresponding hypotheses were answered and tested respectively. Data used for the study were the scores of students' responses to Mathematics Anxiety Questionnaire (MAQ). The data were analyzed using t-test, ANOVA and ANCOVA. The results are that special video instruction had a positive effect on students' anxiety as students exposed to the video instruction recorded lower anxiety scores; and that both male and female students, and low, medium and high scorers benefited equally from the special instruction. It was however recommended among others that video instructions should be encouraged in secondary schools to reduce students' anxiety towards Mathematics.

Keywords: special video instruction, anxiety

1. Introduction

The use and utilities of Mathematics in the daily activities of human beings are so enormous and vast. The subject and its knowledge are knowingly and unknowingly being put to use in every aspect of human lives and endeavors. Every man and woman

ⁱ Correspondence: email olatunjek@gmail.com

need the knowledge of arithmetic for his or her daily commercial activities. To confirm this notion, Otunnu-Ogbisi and Ukpebor (2009) described Mathematics as a tool whose knowledge and skills are the bedrock of all societal transformations and transfer of figures and numbers into reality.

Mathematics, because of its importance has been made a compulsory subject in Nigeria from the basic level up to the senior secondary school level. Any student who aspires to do well in education must of necessity take the study of the subject seriously. The students at both primary and secondary school levels are made to attend Mathematics classes compulsorily, and they are expected to perform well in the subject to be able to progress in their education. Therefore, all efforts must be in place to ensure that students are endeared to the subject and all factors that could jeopardize the successful teaching and learning of the subject must be tackled. Tackling such militating factors would culminate in students' good and acceptable grades in the subject in both internal and external examinations.

Some factors have been identified by researchers in Mathematics education that could militate against the successful study of Mathematics at the secondary school level. Ojimba (2012) highlighted some factors affecting the teaching and learning of Mathematics including; teachers' exhibition of poor knowledge of Mathematics content, over-crowded Mathematics classrooms, negative attitude of students towards Mathematics and teachers' adherence to old, ineffective methods of teaching Mathematics in spite of viable and resourceful methods. Other factors mentioned are paying undue and unnecessary emphasis on coverage of the syllabus at the expense of meaningful learning of Mathematics and Mathematics concepts, inadequate resources and lack of Mathematics laboratories in schools, students' early negative notion about Mathematics, negative peer group influence and lack of Mathematics teachers' initiatives. In addition, researchers such as Attwood (2014), and Karue and Amukowa (2014) attributed the poor performance in Mathematics in Kenya to a number of factors. These factors according to them include students' misconception of Mathematics as a difficult subject, fear and anxiety. Other factors pointed out are a parental attitude, interrupted teaching and poor teaching. The researchers also pointed out the lack of qualified teachers, well-equipped laboratories and libraries, home and environmental factors, as well as little participation of parents in the education of their wards as part of the factors contributing to students' poor performance in Mathematics in Kenya.

These factors identified have to be adequately examined and tackled decisively if students must do well in Mathematics. Very key factors are Mathematics fear and anxiety and poor instructional methods adopted by Mathematics Teachers. The question is, could it be that students have anxiety and fear towards Mathematics because of the poor or inappropriate methods used to teach the subject by their Teachers? Could it also be that if a good instructional method is adopted, students' anxiety towards the subject might reduce? These are pertinent questions that should bother stakeholders in a bid to proffer solutions.

Mathematics anxiety could be a hindrance to students studying Mathematics (Abbasi, Samadzadeh, & Shahbazzadegan, 2013). Anxiety is a state of fear and apprehension towards an event. Many students experience anxiety towards Mathematics. The anxiety students experience towards Mathematics and Mathematics tests and examinations are in three levels namely low, moderate and high (Nonyelu & Anikweze, 2013). Students with low and medium anxiety towards Mathematics can still manage to get along with the learning of the subject without much disruption, but students with high anxiety towards Mathematics tend to be out rightly troubled with anything relating to Mathematics. Nonyelu and Anikweze (2013) also reported that the relationship between anxiety and achievement is significant. That is, students with high anxiety in Mathematics perform low in the subject and vice-versa.

The source of Mathematics anxiety in students may be due to poor instructional methods and the quality of Mathematics teaching at the elementary school level. Also, Mathematics anxiety may happen in the classroom due to teachers' lack of consideration of the different learning styles of students. Paeinkerton (2005) confirmed that Mathematics anxiety may develop in children before school from the wrong perception inherited from parents who have anxiety towards Mathematics themselves. The wrong teaching methods employed by teachers in school may then heighten such anxiety.

Gender has been identified as one of the factors influencing students' interest, anxiety and achievement in Mathematics (Popoola & Ajani, 2011). Gender issues as a factor or variable are not skewed in any direction. There are different findings on gender matters, some in favor of males, others in favor of females and sometimes no gender difference is reported. Ikeazota (2003) found no significant difference in the achievement between male and female students in quadratic equations. This agrees with Aiyedun (2000) who also found no significant difference between male and female SS1 students' performance in Mathematics scores. However, Ifeanacho (2012) revealed that a significant difference exists in favour of boys in computational problems while girls outperformed boys in verbal problems.

Mathematics anxiety in students varies from male to female students. A study conducted by Abadi (2004) showed that there was a significant difference between girls' and boys' Mathematics anxiety, as Mathematics anxiety in boys is higher than that of girls. Therefore, Mathematics anxiety in students is a challenge that must be tackled to ensure effective teaching and learning of Mathematics in Nigerian schools. Nonyelu & Anikweze (2013) suggested that if teachers must reduce students' anxiety level about Mathematics tests, they should employ frequent testing, assignments, projects, learning by doing, students' active participation in Mathematics lessons, students-centered learning, effective teaching/learning methods and aids and test-taking strategies. These discussions confirm that the teacher is a very critical factor holding a central position in teaching and learning activities in schools.

The teacher, however effective can only do his or her best to teach students mathematics concepts. However, when a teacher combines his expertise with instructional tools such as video instruction, what results is a combination of talent and

tools that represent a new formidable and productive system (Onasanya & Adegbija, 2007). In this new system, Onasanya and Adegbija (2007) affirmed that when the teacher uses the tool (Special Video Instruction in this case), the medium is no more an aid to the teacher, but the teacher an aid to the medium. When this happens, the new system is believed to be a means of boosting students' interest and reducing their anxiety levels towards Mathematics and Mathematics tests.

Video instructions in mathematics could become an efficient strategy in the hands of competent teachers for more effective teaching. The instructional video promotes self-directed learning, increases motivation and activates learners to find their own solutions, thereby increasing self-confidence (Strathie, 2006). Moreover, Allam (2006) affirms that video instruction which uses moving images and sound to communicate a topic provides insight for the students, and in addition to this enables students to acquire a range of transferable skills such as research skills, collaborative working, problem-solving skills, technology and organizational skills. Special Video Instruction when adopted to teach some Mathematics concepts may serve as a means of reducing students' anxiety in Mathematics, and improving their performance in the subject.

2. Statement of the Problem

Students at the basic and secondary school levels of education face many challenges studying Mathematics, hence they perform unsatisfactorily in the subject both in external and external examinations. Some factors discovered to be responsible for this are the teachers' use of old and inefficient instruction methods and students' anxiety towards the subject. It can then be inferred that students' anxiety towards the subject might be as a result of the poor instructional methods adopted by teachers, which makes Mathematics look like a boring, uninteresting and difficult subject.

Some topics in the secondary school Mathematics curriculum have also been identified to be particularly difficult for students to easily understand. One of such topics is Mensuration which is taught at the Senior Secondary School. It is believed that when there is a shift from the old methods of instruction to a more interesting and captivating method such as video instruction, students' attention may likely be enhanced and this would reduce their anxiety in the subject and thereby foster good performance. Onasanya and Adegbija (2007) posited that the use of computer instructional aids such as video instruction could assist teachers and learners, promote positive change in students' attitudes towards learning, increase students' willingness to learn and foster performance.

Research works have been carried out on the effects of Computer Aided Instructions on Students' performance in Mathematics and other subjects. Akerele and Afolabi (2012) conducted research on the effect of video on the teaching of Library Studies among undergraduates in Adeyemi College of Education, Ondo. Also, Kevogo, Toili, and Mutsoso (2013) investigated the effect of the general use of computers on secondary school students' performance in Biology in Kenya. No known research has been carried

out on the effect of video instruction on students' Mathematics Anxiety in Nigeria. This research was poised to fill the gap.

2.1 Objectives of the Study

The main purpose of this study was to determine the effects of Special Video Instruction (SVI) on senior school students' anxiety in Mensuration in Gwagwalada, Nigeria. Specifically, the study determined the:

- difference that exists in the anxiety mean scores of students taught Mensuration using SVI and those taught without SVI;
- difference in the anxiety mean scores of male and female students taught Mensuration using SVI;
- difference that exists in the anxiety mean scores of high, medium and low scorers taught Mensuration using SVI.

2.2 Research Questions

To give focus to the study, answers were sought for the following Research Questions:

- 1) what difference exists between the anxiety mean scores of students taught Mensuration using SVI and those taught without SVI?
- 2) what is the difference between the anxiety mean scores of male and female students taught Mensuration using SVI?
- 3) what is the difference in the anxiety mean scores of high, medium and low scorers taught Mensuration using SVI?

2.3 Hypothesis

The following hypothesis was formulated for the study:

Ho₁: there is no significant difference in the anxiety mean scores of students taught Mensuration using SVI and those taught without SVI;

Ho₂: There is no significant difference in the anxiety mean scores of male and female students taught mensuration using SVI and

Ho₃: There is no significant difference in the anxiety mean scores of high, medium and low scorers taught mensuration using SVI.

3. Methodology

The design for this study was a quasi-experimental design of pre-test, post-test, non-randomized and non-equivalent control group types. Two groups were involved, the experimental group (which was exposed to Special Video Instruction) and the control group (which was not exposed to Special Video Instruction). Both groups were subjected to pre-test and post-test. The design is a 2 x 5 quasi-experimental design illustrated as follows:

O1 X1 Y1Y2 Z1 Z2Z3 O2

O1 - Y1Y2 Z1Z2Z3 O2

Key:

O1 represents the pre-test for the experimental and control group;

O2 represents the post-test for the experimental and control group;

- -shows that intact classes were used for both experimental and control groups;

X1 represents treatment (Special Video Instruction) for the experimental group;

Y1 represents males for the two groups;

Y2 represents females for the two groups;

Z1 represents high scorers;

Z2 represents medium scorers;

Z3 represents low scorers.

The population for this study were all Senior Secondary School One (SSS 1) students in Nigeria. The choice of SS1 students was premised on the fact that the preliminary aspects of Mensuration which is the topic being considered in this study is expected to be covered in the SSS 1 Mathematics curriculum. The target population consisted of all SS 1 students in Gwagwalada, Abuja. Questionnaires on anxiety were administered to both groups to measure anxiety in the study.

A three-stage sampling technique was used to select samples for the study. The first stage involved the purposive selection of two co-educational schools that are far apart from each other within Gwagwalada Area Council. The schools were purposively selected because the schools to be used for the research were expected to have basic amenities such as an electricity supply and spacious classroom facilities that could be used for video classes. The second stage involved the random selection of an intact class, precisely a science class out of the science classes from each of the two schools. The third stage involved the random assigning of the two schools to the experimental and control group. After randomly determining the control and experimental group, a pretest was administered to the two groups. The experimental class was taught Mensuration content using SVI while their control group counterparts were taught using the normal conventional method.

There were three instruments used. The first instrument was the treatment, which was the video instruction on Mensuration. The video instruction was transmitted from the computer to a big flat-screen television through a transmission cable called HDMI, which transmits both audio and video effects from enhanced computer systems to the television. This system worked better than a projector platform in terms of the super quality of the image and voice production. There was also little or no interference of light on the quality of the video production. The experimental class received instruction on Mensuration from the enhanced computer video platform while students in the control class received conventional instruction on Mensuration from their teacher. The researcher developed the Special Video Instruction with the assistance of computer animation

professionals. The video instruction project covered the selected topics under Mensuration, which include the length of the arc, length of chord, area and perimeter of the sector, area and perimeter of segments, surface area and volume of solids such as cubes, cuboids and cylinders. A trained Mathematics instructor handled the video instruction.

The second instrument was harmonized lesson notes on the selected topics which were used by the two instructors (video and normal classroom instructors). The video instructor after being properly trained by the researcher presented his lessons while being video recorded. The animations of all diagrams in the lesson were fully and professionally incorporated, and all statements emphasized by the teacher, especially the formulae derived and mathematical steps taken while working out a solution to problems are boldly and professionally zoomed in the video to capture students' attention. A total of five lesson periods of 80 minutes was used for the intervention.

The third instrument was Mathematics Anxiety Questionnaire (MAQ). There were two fashions of the MAQ. Each of them contained 20 items on Mathematics anxiety. The first one, which contained items on anxiety, was administered to students in both the control and experimental group. The second one which contained items on anxiety linked with video instruction was administered to only students in the experimental group to further ascertain and confirm the effects of video instruction on students' anxiety. The first and second fashions of the instruments were respectively adopted and adapted by the researcher from the Mathematics Anxiety Rating Scale (Suinn & Winston, 2003) and they were used to measure Mathematics anxiety. MAQ had a four-point Likert-type response scale namely: Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD).

The visibility, audibility, simplicity of the methods used and clarity of the SVI were validated by experts. The video instruction was also pre-viewed by the experts and all their observations, comments and concerns were incorporated into the final production of the videos before being used as the treatment for the experimental group. The face, construct and content validity of Mathematics Anxiety Questionnaire (MAQ) were ensured by giving the instruments to experts in Mathematics Education and Education Psychology. The Cronbach's alpha reported by Suinn & Winston (2003) for the internal consistency of the adapted MAQ was 0.81. However, the reliability of the video version of MAQ was re-determined using Cronbach alpha to determine the internal consistency of the items. The internal consistency index obtained was 0.85. MAQ was administered to students in both experimental and control classes. Research question 1 was answered using Mean and Standard Deviation, research question 2 was answered using a *t*-test, and research question 3 was answered using ANOVA. Research hypothesis 1 was tested using Analysis of Covariance (ANCOVA), hypothesis 2 was tested using *t*-test while hypothesis 3 was tested using Analysis of Variance (ANOVA). The data were analyzed at 0.05 alpha level using the Statistical Package for Social Science (SPSS) version 21.0.

3.1 Demographic Information

Frequency counts and percentages were used to describe the personal characteristics of the respondents. Table 1 shows that out of 133 students that participated in study 71 (53.4%) were males and 62 (46.6%) were females. This implies that the male participants were more than their female counterparts.

Table 1: Gender Distribution of the Respondents

| Gender | Frequency | Percentage (%) |
|--------|-----------|----------------|
| Male | 71 | 53.4 |
| Female | 62 | 46.6 |
| Total | 133 | 100.0 |

Table 2 shows that 74 (55.6%) of the subjects were in Experimental group and 59 (44.4%) were in Control group based on the intact class selected for each group based on the intact class selected for each group.

Table 4: Distribution of the Respondents Based on Group

| Group | Frequency | Percentage (%) |
|--------------|-----------|----------------|
| Experimental | 74 | 55.6 |
| Control | 59 | 44.4 |
| Total | 133 | 100.0 |

4. Results

Research Question 1: What difference exists between the anxiety mean scores of students taught Mensuration using SVI and those taught without SVI?

Research Hypothesis 1: There is no significant difference in the anxiety mean scores of students taught Mensuration using SVI and those taught without SVI

Table 3 shows that students exposed to SVI had a lower anxiety mean score of 41.6 than students not exposed to SVI who had a higher anxiety mean score of 58.0 which indicated a difference of 16.4 in the anxiety mean scores between the two groups.

Table 3: Anxiety Mean Scores of the Two Groups

| Group | Mean | Std. Deviation |
|--------------|------|----------------|
| Experimental | 41.6 | 8.00 |
| Control | 58.0 | 15.60 |

To determine whether there is a significant difference in the anxiety mean scores of students in the two groups, the respondents' scores were analyzed using ANCOVA. Table 4 shows df (1, 132) and F value of 41.188 which is significant at 0.05 alpha level. Hypothesis 2 is therefore rejected since P value 0.000 is less than 0.05 alpha level (0.000 < 0.05). This implies that there is a significant difference in the anxiety mean scores of students taught Mensuration using SVI and those taught without SVI.

Table 4: Analysis of Covariance of Anxiety Mean Scores of Students in the Two Groups

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|-----------------|-------------------------|-----|-------------|---------|------|---------------------|
| Corrected Model | 9803.019 ^a | 4 | 2450.755 | 17.634 | .000 | .355 |
| Intercept | 54670.060 | 1 | 54670.060 | 393.372 | .000 | .754 |
| Pre_Test | 686.212 | 1 | 686.212 | 4.938 | .028 | .037 |
| Group | 5724.215 | 1 | 5724.215 | 41.188 | .000 | .243 |
| Gender | 227.758 | 1 | 227.758 | 1.639 | .203 | .013 |
| Group * Gender | 1.629 | 1 | 1.629 | .012 | .914 | .000 |
| Error | 17789.165 | 128 | 138.978 | | | |
| Total | 344870.500 | 133 | | | | |
| Corrected Total | 27592.184 | 132 | | | | |

a. R Squared = 0.355 (Adjusted R Squared = 0.335)

Research Question 2: what is the difference between the anxiety mean scores of male and female students taught Mensuration using SVI?

Research Hypothesis 2: There is no significant difference in the anxiety mean scores of male and female students taught Mensuration using SVI.

In order to determine the difference in the anxiety mean scores of male and female students, the respondents' scores were analyzed using *t*-test. The result from Table 5 shows the *t* value yielded 1.894 and the P value of 0.062 > 0.05. This shows a non-significant result. Hence, the null hypothesis is not rejected. This means that there is no significant difference in the anxiety mean scores of male and female students taught Mensuration using SVI ($t_{(72)} = 1.894$; $P > 0.05$). Although the anxiety mean score of female (43.0) is slightly higher than that of the male (39.5), it is not significant.

Table 5: Mean, Standard Deviation and t-Test Analysis of Anxiety Mean Scores of Male and Female Students Taught Mensuration Using SVI

| Variables | N | Mean | SD | t | df | Sig (2 tailed) | Decision |
|-----------|----|------|------|-------|----|----------------|--------------|
| Male | 31 | 39.5 | 7.50 | 1.894 | 72 | .062 | Not Rejected |
| Female | 43 | 43.0 | 8.09 | | | | |

$P > 0.05$

Research Question 3: What is the difference in the anxiety mean scores of high, medium and low scorers taught Mensuration using SVI?

Research Hypothesis 3: There is no significant difference in the anxiety mean scores of high, medium and low scorers taught Mensuration using SVI.

To determine the difference in the anxiety, mean scores of high, medium and low scorers, the respondents' scores were analyzed using ANOVA. From Table 6, the result shows the df (2, 73) and F value yielded 0.086 which is not significant at 0.05 alpha level. Hence, the null hypothesis is not rejected since the P-value 0.917 is greater than 0.05 (0.917 > 0.05). This means that there is no significant difference in the anxiety mean scores of high, medium and low scorers when taught Mensuration using SVI ($F_{(2, 73)} = 0.086$; $P > 0.05$).

Table 6: ANOVA of the Anxiety Mean Scores of High, Medium and Low Scorers Taught Using SVI

| | Sum of Squares | df | Mean Square | F | Sig. | Decision |
|----------------|----------------|----|-------------|------|------|--------------|
| Between Groups | 11.302 | 2 | 5.651 | .086 | .917 | Not Rejected |
| Within Groups | 4645.360 | 71 | 65.428 | | | |
| Total | 4656.662 | 73 | | | | |

P > 0.05

5. Summary of Major Findings

The following is summary of the findings from this study:

- 1) SVI had a positive effect on students' anxiety towards Mensuration because students taught using SVI had reduced anxiety mean scores compared with their counterparts taught without SVI.
- 2) No significant difference existed in the anxiety mean scores of male and female students when taught Mensuration using SVI.
- 3) No significant difference existed in the anxiety mean scores of high, medium and low scorers taught Mensuration using SVI.

6. Discussion

The findings of this study revealed that Special Video Instruction (SVI) has significant effects on students' anxiety in Mensuration in Gwagwalada, Nigeria. Students taught Mensuration using SVI had decreased anxiety in the topic. The study specifically showed that SVI has a significant effect on students' anxiety towards Mensuration. This may be due to the fact that SVI provides a new environment that slightly deviates from the normal boring classroom environment devoid of stress and fear. It may also be due to the fun attached to watching Mathematics instruction on video. The students seemed to enjoy watching the video while they learn. This finding is consistent with the works of Alshawa & Ahayek (2009) and Awofala (2017) who reported that teaching methods via computer and personalization of instruction respectively reduced students' anxiety.

On the basis of gender, the findings revealed no significant difference in the anxiety mean scores of male and female students when taught Mensuration using SVI. It showed that both male and female students equally benefitted from SVI. That is, SVI equally reduced their anxiety about the topic. These findings contradicted the reports of Tabassum (2004), Abadi (2004), Ifeanacho (2012) and Valencia (2016) who reported differences in the achievement scores of male and female students when taught using computer-assisted instructions. However, the finding is in agreement with the findings of Sheetal (2008), Akerele and Afolabi (2012), Yusuf and Afolabi (2014) and Fakomogbon et al. (2014) who also reported no significant difference in the achievement mean scores of male and female students when taught using computer-assisted instructions.

Furthermore, the findings revealed no significant difference in the anxiety mean scores of high, medium and low scorers. All the categories of students (low, medium and

high scorers) benefitted equally from SVI as far as their anxiety towards the topic is concerned. This finding is at variance with the studies of Ayinla (2011) who reported that there was a significant difference between the mean post-test and pretest mean scores among students of different scoring levels when exposed to mathematics word problem solving with instructional strategy pattern with the low scoring group benefiting from the treatment more than any other group. This is also contrary to the study of Sam-Kayode and Salman (2015) who carried out a study on the effect of the ludo game on senior school students' performance in probability. The researchers reported that significant differences existed in the mean scores of high, medium and low-scoring students exposed to the ludo game instructional strategy while teaching probability in favor of the low-scoring students.

7. Conclusion

This study concluded that SVI is an effective instructional strategy to reduce students' anxiety towards Mathematics topics and contents. This is because the findings of the study have shown that SVI reduces students' anxiety in studying Mensuration which puts students in the right state of mind to learn meaningfully. The study also concluded that gender is not an issue in the implementation of SVI in schools since the findings revealed that both male and female students equally benefitted from the video instruction. In other words, SVI is good for both male and female students. Lastly, SVI equally reduces students' anxiety across all categories of scoring abilities. This implies that SVI is a good instructional strategy that takes care of all categories of students namely High, medium and low-scoring students.

7.1 Implication of the Study

The implication of this study is that when Special Video Instruction (SVI) is used as an instructional strategy, it has the capacity to reduce students' anxiety in studying Mathematics.

7.2 Recommendations

Based on the findings, the following recommendations were made:

- 1) Government is encouraged to invest well in computers and other enhancing amenities in schools so as to provide enabling environment for Mathematics teachers to adopt SVI in order to reduce their anxiety towards Mathematics.
- 2) Trainings should be organized for teachers and other stakeholders in the area of computer literacy for a successful implementation of SVI.
- 3) Teachers should be encouraged and incentivized to avail themselves of computer training opportunities and get needed training with minimum persuasions.
- 4) Teachers should be innovative and ingenuous to develop computer instructional tools for use in schools

- 5) Teachers should also be encouraged to be dedicated to duty and be ready to sacrifice time, money and energy in developing video Instructions.

Conflict of Interest Statement

The authors hereby state that there is no conflict of interest in respect of the paper titled "Special Video Instruction and Senior Secondary School Students' Anxiety towards Mensuration in Gwagwalada, Nigeria".

About the Authors

Jekayinfa, Olatunji James (PhD) is a Researcher and Mathematics Education expert who works with the National Mathematical Centre, Abuja in the Mathematical Sciences Education Programme. He is presently a Research Fellow and his area of Research interest ranges from developing new strategies of Mathematics teaching to develop students' interest in Mathematics, to innovating, developing and deploying technology in the teaching and learning of Mathematics with a view to boosting Students' interest and ultimately enhancing their performance in the subject. He is a registered member of Mathematical Association of Nigeria (MAN). He is also a member of the Academia.edu Research Group.

Owonuwa, Seun is an Assistant Research Fellow from the Mathematical Sciences Education Programme at the National Mathematical Centre, Abuja. He is a seasoned Mathematics Teacher and a Researcher in the area of Mathematics Education. He has researched extensively in the area of Teaching and Learning of Mathematics especially at the primary and secondary school education levels with emphasis on developing new strategies in the teaching and learning of the subject with a view to improving Students' performance.

References

- Abadi, L. (2004). *Relationship between demographic variables and mathematics anxiety in high school students in Tehran*. Master's Thesis, Tehran Teachers Training University, Department of Psychology and Educational Sciences.
- Abbasi, M., Samadzadeh, M., & Shahbazzadegan, B. (2013). Study of mathematics anxiety in high school students and its relationship with self-esteem and teachers' personality characteristics. *Procedia-Social and Behavioral Sciences*. 83, pp. 672-677. Elsevier Ltd. Retrieved from www.sciencedirect.com
- Aiyedun, J. O. (2000). Influence of sex difference of students on their achievement in secondary school mathematics. *ABACUS, Journal of the Mathematical Association of Nigeria*, 25(1), 102-113.
- Akerele, J. A., & Afolabi, A. F. (2012). *Effects of Video on the teaching of library studies among undergraduates in Adeyemi College of Education, Ondo*. Retrieved from <http://unllib.unl.edu/LPP/>

- Allam, C. (2006). Using filmmaking to teach students about Shakespeare, urban regeneration and other stuff. *DIVERSE Conference*.
- Alshawa, H., & Ahayek, S. (2009). The effect of teaching method via computer on students' anxiety. *Damascus University Journal*, 25(1), 56-61.
- Alshawa, H., & Alhayek, S. (2009). The effect of teaching method via computer on students' anxiety. *Damascus University Journal*, 25(3), 36-67.
- Attwood, T. (2014, October 19). *Why are Some Students so Poor at Mathematics*. Retrieved from <http://www.senmagazine.co.uk/articles/senarticles/why-are-some-people-so-poor-at-maths>.
- Awofala, A. O. (2017). Effect of personalisation of instruction on students' anxiety in word problem in Nigeria. *Bulgarian Journal of Science and Education*, 11(1), 83-92.
- Ayinla, J. O. (2011). *Effects of Teachers' Instructional Strategy Pattern on Senior School Students' Performance in Mathematics Word problems in Ondo, Nigeria*. University of Ilorin, Ilorin.
- Fakomogbon, M. A., Omiola, M. A., Awoyemi, S. O., & Mohammed, R. E. (2014). Effects of computer-assisted instructional package on the performance of students in mathematics in Ilorin metropolis. *European Scientific Journal*, 10(25), 196-206.
- Ifeanacho, A. O. (2012). *Effect of the Kumon teaching strategy on junior secondary school students' achievement, interest and retention in statistics*. University of Nigeria, Nsukka.
- Ikeazota, N. N. (2003). *Identification and Remediation of Senior Secondary School Students' Process Errors in Quadratic Equations*. Unpublished Doctoral Dissertation, University of Nigeria, Nsukka.
- Karue, N., & Amukowa, W. (2014, October 19). *Analysis of Factors that Lead to Poor Performance in Kenya Certificate of Secondary Examination in Embu District in Kenya*. Retrieved from <http://www.tijoss.com/TIJOSS%2013th%20Volume/Amukowa.pdf>.
- Kevogo, N., Toili, W., & Mutsoso, S. (2013). Effect of general computer use on secondary school students' performance in Biology. *General Journal of Computer Science*, 1(1), 16-30.
- Nonyelu, R. N., & Anikweze, C. M. (2013). Assessment of the Anxiety Levels of Mathematics Students in Federal Capital Territory (FCT) Junior Secondary Schools. *ABACUS-The Journal of the Mathematical Association of Nigeria*, 37(1), 73-83.
- Ojimba, D. P. (2012). Mathematics education for sustainable development: Implication for scientific and technology literacy. *Journal of Education and Social Research*, 3(15), 22-30.
- Onasanya, S. A., & Adegbija, M. V. (2007). *Practical Handbook on Instructional Media*. Ilorin: Graphcom Publishers.
- Otunu-Ogbisi, R. O., & Ukpebor, J. N. (2009). Mathematics Education: A tool for technological development in Nigeria. *ABACUS: The Journal of Mathematical Association of Nigeria*, 34(1), 46-53.

- Paeinkerton, S. P. (2005). *Attention Deficits and Hyperactivity in Children*. ASGE Publications.
- Popoola, B. A., & Ajani, T. O. (2011). Influence of pupils' gender, environment and school ownership status on mathematics performance of secondary school students in Yewa North, Ogun State. *ABACUS Journal of Mathematical Association of Nigeria*, 36(1), 56-65.
- Sam-Kayode, C. O., & Salman, M. F. (2015). Effect of ludo game on senior school students' performance in probability. *ABACUS-Journal of the Mathematical Association of Nigeria*, 40(1), 83-91.
- Sheetal, M. (2008). *Effect of computer-assisted instruction on academic achievement of IX class students in Biology*. University of Kurukshetra.
- Strathie, C. (2006). *Promoting Collaborative Learning and Development through Video Enhanced Reflective Practice (VERP)*. Retrieved November 12, 2017.
- Suinn, R. M., & Winston, E. H. (2003). The mathematics anxiety rating scale, a brief version: Psychometric data. *Sage Journals*, 92(1), 56-67.
- Tabassum, R. (2004). *Effect of computer-assisted instruction on secondary school students' achievement in science*. University of Arid Agriculture, Rawalpindi.
- Valencia, B. (2016). *Impact of computer-assisted instruction on achievement of seventh-grade mathematics*. Monterey Bay: California State University.

Creative Commons licensing terms

Author(s) will retain the copyright of their published articles agreeing that a Creative Commons Attribution 4.0 International License (CC BY 4.0) terms will be applied to their work. Under the terms of this license, no permission is required from the author(s) or publisher for members of the community to copy, distribute, transmit or adapt the article content, providing a proper, prominent and unambiguous attribution to the authors in a manner that makes clear that the materials are being reused under permission of a Creative Commons License. Views, opinions and conclusions expressed in this research article are views, opinions and conclusions of the author(s). Open Access Publishing Group and European Journal of Education Studies shall not be responsible or answerable for any loss, damage or liability caused in relation to/arising out of conflicts of interest, copyright violations and inappropriate or inaccurate use of any kind content related or integrated into the research work. All the published works are meeting the Open Access Publishing requirements and can be freely accessed, shared, modified, distributed and used in educational, commercial and non-commercial purposes under a [Creative Commons Attribution 4.0 International License \(CC BY 4.0\)](https://creativecommons.org/licenses/by/4.0/).