

Mathematics Self-Efficacy and Study Habit as Predictors of Achievement of Senior Secondary School Students

Akorede A. Asanre¹, Aviwe Sondlo², Taurayi Willard C.², Abiodun Taiwo O.¹

^{1,2} Department of Mathematics, Science and Technology Education, University of Zululand, KwaDlangezwa, South Africa.

¹ Department of Mathematics, Tai Solarin University of Education, Ijagun, Ijebu-ode, Ogun-state, Nigeria.

Email: AsanreA@unizulu.ac.za

Corresponding author:	Abstract
Akorede Ayoola Asanre AsanreA@unizulu.ac.za	This study therefore looked at Mathematics Self-Efficacy and Study Habit as Predictors of Academic Achievement of Senior Secondary School Students in Ijebu Ode Local Government Area, Ogun State, Nigeria. Three hypotheses that were examined at the 0.05 significance level served as the study's compass. Descriptive survey was used, 500 students sampled from 10 senior secondary schools in Ijebu ode using simple random sampling techniques. mathematical achievement test, study habit scale, and self-efficacy scale constitute the instruments, validated and demonstrates reliability coefficients of 0.78, 0.81 and 0.86. The results shows that self-efficacy and study habit will accurately forecast students' academic success in mathematics ($F = 38.328, p < 0.05$ & $F = 35.011, p < 0.05$) and jointly predict students' proficiency in mathematics ($F = 49.136, p < 0.05$). The conclusion derived is that both Study habits and self-efficacy are significant predictors of academic achievement of senior secondary school students in mathematics.
Keywords: Academic Achievement; Mathematics; Self-efficacy; Study habit; Students	

Asanre, A. A., Sondlo S., T.W., Chinaka, T. W. & Oluwadoyo, A. T.. (2024). Mathematics Self-Efficacy and Study Habit as Predictors of Achievement of Senior Secondary School Students. *Mathematics Education Journal*, 8(2), 137-146. DOI: 10.22219/mej.v8i2.34183

INTRODUCTION

Almost all academic areas may benefit greatly from the study of size and number, which is mathematics. (Schenkel, 2020). This is due to the fact that it is essential to all academic disciplines for problem solving and outcome prediction. The fact is that mathematics education is today more important than it was for schoolchildren alone. However, nowadays, mathematics is a life skill. Because of the complexity of digitalization and the prominence of scientific and technical growth in our society, it now permeates every aspect of existence, (Asanre et al, 2023). One of the fundamental courses in the national curriculum is mathematics, It should be studied for learners' application of skills, appreciation, and enthusiasm in addition to their understanding and grasp of mathematical concepts, (Asanre, et al, 2024).

To assist Nigeria's advancement in technology and economy, students are urged to engage in science-related courses, as mathematics is a topic shared by all disciplines, according to Ifamuyiwa et al. (2018). Also, Mathematics has often been perceived as a subject exclusive to science students. However, In the modern age of advanced digitalization, technology and science, its relevance has expanded far

beyond just academia. Mathematics is now an integral part of everyday life and is vital in various spheres, emphasizing that it's not just for students but for everyone, (Asanre et al. 2023).

Regardless of all the academic, practical, social, cultural, and universal benefits of mathematics. The type of instruction, level of engagement, consolidation, application, and transfer of learning are all hampered by the teaching approach, communication issues, and teachers' inability to make the connection between students' immediate environment and their mathematical knowledge, he continued, adding that this is the reason why students fail mathematics classes. Asanre et al (2024) stressed that Mathematics stakeholders are concerned about the declining amount of students' comprehension of mathematical concepts and how to apply them to real-world scenarios. This acts as lead to under achievement in our Nigeria secondary schools.

Also, at secondary school levels in sub-Saharan Africa, students typically do poorly in this important subject, (Schenkel, 2020). In the view of Odiri (2020) opined that Mathematics achievement of students is continuously given attention in various nations as it is thought to be the primary topic, which is important for the expansion and development of the country. It is further stressed by Woji & Charles-Ogan, (2022) they saw achievement as the measuring of students' accomplishment across a range of academic areas. Okoli and Emenike (2023) reported that Strong self-efficacy and effective study habits are essential for every student to flourish intellectually and reach high educational goals.

Bandura first introduced the idea of self-efficacy in his social cognitive theory in the year 1977. According to Badamasi et al (2024) submitted that In Bandura's 1994 Social Cognitive Theory, four processes; the cognitive, motivational, affective, and selection processes were found to be influenced by self-efficacy. Cognitive functions are significantly impacted by an individual's level of self-efficacy. The more confident someone is in themselves, the more likely it is that they will achieve their objectives. On the other hand, people who have low self-efficacy frequently dwell on their flaws, which makes it more likely that they will struggle and fall short of their goals. Self-efficacious people motivate themselves by concentrating on the goals they set for themselves and how they go over challenges to achieve them, (Tus, 2020).

Therefore, the capacity of a learner to succeed at a particular activity is known as self-efficacy, (Okoli and Emenike, 2023). It is further defined by Badamasi et al (2024) as a person's assessment of their own capacity or confidence to do a task. He went ahead to report that one important factor influencing how well people can think through ideas is their level of self-efficacy. Described as having confidence in one's capacity to organize and execute the steps required to accomplish particular objectives. Ajaude & Mgboro (2024) noted that after experiencing academic losses, people regain confidence in their ability to succeed, attributing failure to a lack of effort, inadequate knowledge, and inadequate abilities. They also approach potentially dangerous circumstances believing they have control over them.

As corroborated by Yesuf et al (2023), they reported that a person's situational appraisal of their confidence in their capacity to carry out or solve a certain mathematical assignment or challenge is known as their mathematics self-

efficacy. Ozkal (2019) reported that students with less self-efficacy will attempt to avoid undertaking learning tasks unwillingly or become academically engaged and in turn become unsuccessful. But Students who excel academically and do well in class are indicators of their strong study habits. Udegbe & Okoli (2022) opined that Study habits are the routines followed when reading academic texts or getting ready for examinations. An example of a poor study habit is someone who stays up late the night preceding an examination and occupies the whole time trying to memorize the material. A student with good study habits can learn much more and gain even more from their studies.

This was explained by Bentil (2023), that students with strong study habits are better able to critically reflect on skills outcomes including choosing, evaluating, criticizing, and synthesizing. It makes sense that effective study habits help students use their cognitive processes to find and assess pertinent body of knowledge. Conversely, though, ineffective study techniques limit the capacity of students to participate in beneficial intellectual activities. He further suggested that although bad study habits hinder students' academic progress, excellent study habits boost academic achievement. Reylan et al. (2019) reported that since students cannot absorb all the knowledge, they require on the topic from teachers in a classroom setting, study habits are a key element in determining the quality of education and mathematical success of students.

Castillo et al (2023) reported that the daily experiences of students in the classroom study habits have long been discussed in the classroom. These techniques have the potential to encourage students to become more involved in their education without making them feel pressured or distracted. A student's study habits are a major determinant of their academic achievement. Jafari (2019) noted that because students lack the knowledge necessary to acquire effective and sustained learning, which prevents them from achieving the necessary degree of academic success. They further asserted that productive study practices include finding a quiet area to study, studying on a daily basis, maintaining organization, taking thorough notes, reading textbooks, paying attention in class, and shutting off electronics that distract from studying (including TVs and cell phones). Procrastination, missing class, not completing homework, watching TV or engaging in gaming rather than learning, and learning under inappropriate circumstances are a few examples of poor study habits.

Based on the above, it as shown that students' daily lives require them to have the mathematical knowledge and abilities necessary to overcome any challenges they may encounter. Academic achievement is a multifaceted process that depends on a number of variables, including study habits, self-efficacy, engagement and motivation. Also, extrinsic elements including the kind of school, the way that it is taught, where it is located, the resources it uses, and the way that student's study, self-efficacy, teachers experience amongst other factors have received a lot of attention. Therefore, this study looked at self-efficacy and study habit as predictors of academic achievement of students enrolled in senior secondary schools in mathematics in Ijebu ode Local government Area, Ogun State, Nigeria.

The primary aims this research is to look at self-efficacy and study habit as predictors of mathematics achievement of senior secondary school students. Specifically:

- a. Forecasting the academic achievement of senior secondary school students in mathematics using self-efficacy.
- b. Forecasting the academic achievement of senior secondary school students in mathematics using study habit.
- c. The joint forecasting the academic achievement of senior secondary school students in mathematics using self-efficacy and study habit.

RESEARCH METHOD

Design and participants

In this study, a descriptive survey research methodology was used. with a sample of 500 SS2 students from Ijebu-ode Local Government Area, Ogun State, has ten public senior secondary schools, was chosen using a simple random sampling technique. The choice of class was made due to the fact that the schools must have covered most of the Mathematics SS1 scheme of work.

Survey instrument

The instrument used for this study are mathematics self-efficacy scale, study habit scale and mathematics achievement test. The self-efficacy statement is part of the mathematics self-efficacy measure adapted from Asanre (2023) with the reliability of $\alpha = 0.882$. The modified tool is divided into two sections. Section A consists of the demographic information of the students, the demographic information entails the student's name and school, sex and class. Section B consists of 20 items eliciting information on the self-efficacy of the students to Mathematics. Also, the study habit scale is an instrument split into sections; sections A and B. Section A focuses on demographic information of the respondents such as gender and school name, while section B contained a structured items on four (4) – point Likert scale. The mathematics achievement test is an alternative choice objective test that contained 30 items after undergoing item analysis with a first collection of 100 items designed by the researcher. Each item consists of four options with three diversionary choices and one critical decision.

All the instrument were revalidated by giving it to expert in field of mathematics and mathematics teachers for both face and content validity. To examine the dependability of instruments, the reliability coefficient was calculated using a different sample for the investigation and the findings using both Cronbach alpha and split half method, the reliability coefficient gave 0.78, 0.81 and 0.86. the mathematics teacher in each school served as the research assistance to ensure the students are guided on how to fill the instrument correctly and the responders were promised the secrecy of their replies. The data gathered were sorted and analyzed using regression analysis.

Statement of Hypotheses

The following study's hypotheses were investigated at a significance of 0.05.

- a. Self-efficacy is not a significant predictor of senior secondary school students' achievement in mathematics.

- b. Study habit is not a significant predictor of the academic achievement of senior secondary school students in mathematics.
- c. Self-efficacy and study habit are not a significant predictor of mathematics achievement of senior secondary school students.

RESULTS AND DISCUSSION

Hypothesis one: Self-efficacy is not a significant predictor of senior secondary school students' achievement in mathematics.

Table 1. Regression of self-efficacy on Students' achievement in mathematics.

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	111.401	1	111.401	38.328	.0051 ^b
Residual	14477.391	498	29.071		
Total	14588.792	499			

* Significant of F at $\alpha = .05$

a. Dependent Variable: Students' achievement mathematics

b. Predictors: (Constant): Self-efficacy

Table 2. Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.087 ^a	.08	.06	5.392

The result in Table 1 revealed the regression of the independent variable (self-efficacy) on the students' achievement score in Mathematics. The conclusion demonstrates a substantial outcome ($F = 38.328$, $p < 0.05$). This means that self-efficacy will major predictor of academic success of senior secondary school students in mathematics. Also, the result from table 2 shows an R-Square value of 0.06 and a multiple R- coefficient of 0.08. Hence, self-efficacy contributed 6.0 % of the variation in the dependent variable (students' achievement in Mathematics). As a consequence, the null hypothesis is discarded that stated that self-efficacy is not One important indicator of senior secondary school students' academic achievement in mathematics is rejected. Thus, it is concluded that self-efficacy will strongly influence academic success of senior secondary school students in mathematics.

Hypothesis two: Study habit is not a significant predictor of the academic achievement of senior secondary school students in mathematics.

Table 3. Regression of study habit on Students' achievement in mathematics.

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	138.664	1	138.664	35.011	.0062 ^b
Residual	19723.144	498	39.605		
Total	19861.808	499			

* Significant of F at $\alpha = .05$

a. Dependent Variable: Students' achievement mathematics

b. Predictors: (Constant): ssudy habit

Table 4. Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.084a	.07	.05	6.293

The result in Table 3 revealed the regression of the independent variable (study habit) on the on the students' achievement score in Mathematics. The result demonstrates a substantial outcome ($F = 35.011$, $p < 0.05$). This means that study habit will considerably predictor of academic achievement of senior secondary school students in mathematics. Also, the result from table 4 displays an R-Square value of 0.05 and a multiple R-coefficient of 0.07. Hence, study habit contributed 5.0 % of the variation in the dependent variable, which is the mathematical achievement of students. Therefore, the null hypothesis that stated that study habit is not a significant predictor of academic achievement of senior secondary school students in mathematics is rejected. Thus, it is concluded that study habit strongly predicts senior secondary school students' achievement in mathematics.

Hypothesis three: Self-efficacy and study habit are not a significant predictor of mathematics achievement of senior secondary school students.

Table 5. Regression of self-efficacy and study habit on Students' achievement in mathematics.

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	78.946	1	78.946	49.136	.0027b
Residual	8001.846	498	16.068		
Total	8080.792	499			

* Significant of F at $\alpha = .05$

- a. Dependent Variable: Students' achievement mathematics
- b. Predictors: (Constant): self-efficacy and study habit

Table 6. Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.099a	.010	.08	4.008

The result in Table 5 revealed the regression of the independent variable (self-efficacy and study habit) on the on the students' achievement score in Mathematics. The outcome demonstrates a noteworthy result ($F = 49.136$, $p < 0.05$). This suggests that study habits and self-efficacy will be important indicators of senior secondary school students' academic success in mathematics. Also, Table 4's outcome displays an R-Square value of 0.08 and a multiple R-coefficient of 0.01. Hence, self-efficacy and study habit contributed 8.0 % of the variation in the dependent variable, which is the mathematical achievement of the students. Hence, the null hypothesis, which claimed self-efficacy and study habit is not a significant predictor of senior secondary school students' achievement in mathematics is rejected. Thus, it is concluded that self-efficacy and study habit strongly predict competence in mathematics of senior secondary school students.

Discussion of results

Findings revealed that self-efficacy significantly predict academic achievement of students in senior secondary school mathematics exhibit a statistically significant result ($F = 38.328, p < 0.05$). These outcomes align with that of Ajaude & Mgboro (2024), they concluded that the senior secondary school student's academic performance is predicted in part by self-efficacy and locus of control. Additionally, Badamasi et al. (2024) study concluded that significant relationship exists between personality traits, self-efficacy and scholastic success of Katsina Zonal Education senior secondary school students. Self-efficacy show that is a significant predictor variable of student's achievement because it is further buttressed by Yesuf et al (2023) it was discovered that over half of the students had strong mathematics self-efficacy, and that the students' total mathematics self-efficacy is greater than average. Kamau, et al (2023) showed a significant and positive relationship between students' achievement in mathematics in Kenyan public elementary schools and their academic self-efficacy. It corroborates the study of Onoshakpokaiye (2020), who came to the conclusion that student's success in mathematics in Delta State, Nigeria's, Delta Central Senatorial District, is predicted by strong self-efficacy.

According to Okafor and Okoli (2020), academic self-efficacy and emotional intelligence were noteworthy biologically-related predictors. Additionally, the results showed that study habits strongly influence senior secondary school students' academic ability in mathematics ($F = 35.011, p < 0.05$). This corroborates the conclusion of Bentil (2023) indicates that study habits and overall academic achievement have a strong and statistically significant relationship. Also, Castillo et al (2023) demonstrate study habits' impact on academic performance. Additionally, Udegbe et al (2022) that biology students' interest is substantially predicted by their study habits. It also, align with that of Ozioko (2019), study habits were a strong predictor of academic success for senior secondary school biology students. But didn't align with the conclusion of Okoli & Emenike (2023) submitted even in biology, study habits do not significantly influence academic success. This discrepancy may be caused by the subject matter, the way students feel about their teachers and schools, the distance between the school and homes, the absence of parental supervision, the quality of the library's text books, or the absence of a biology laboratory.

The finding revealed that self-efficacy and study habit substantially predict senior secondary school students' academic success in mathematics have a noteworthy result ($F = 49.136, p < 0.05$). This aligns with the finding of Udegbe & Okoli (2022) carried out on biology students in Ogidi education zone, which they found that attributional styles, study habits, and self-efficacy strongly and favorably influenced interest in biology, which further contributes to successful outcomes. The findings are rooted in the social cognitive theory of Bandura with the idea that when individual create their own way of doing things that is having good study habit which give room for personal self-efficacy is instrumental to the goal they intend to achieve and they will be able to control their environment, that is having good academic achievement.

CONCLUSION

The results indicate that students at senior secondary schools in Ijebu Ode Local Government Area, Ogun State, Nigeria academic achievement in mathematics is strongly predicted by self-efficacy and study habit. Showing that the selected students' level of confidence towards the learning of mathematics was high, this might have been due to their commitment to using appropriate study habit. It is then concluded that students in senior secondary schools' achievement in mathematics is predicted by their study habits and sense of self-efficacy, most especially, the students in Ijebu ode Local Government Area of Ogun State, Nigeria. Therefore, it is recommended that all stakeholders in the process of instruction and learning should ensure that the students are encourage, continuous engagement, use of appropriate instructional strategies to ensure that the high level of self-efficacy and study habit of the students is maintained. Also, studies can be carried out in other parts of the state and country due to the sample size used in the study which was not necessarily a true representative of all secondary school students in Ogun state, Nigeria. In addition, this study will serve as a base line for further research.

Acknowledgement

We appreciate all our researcher assistances, study participants and all the school used.

REFERENCES

- Ajaude, C. K. & Mgboro, U. C. (2024) Self Efficacy, Locus of Control and Academic Achievement of Senior Secondary School Students in Mathematics in Ebonyi State, Nigeria. *IOSR Journal of Humanities and Social Science (IOSR-JHSS)* Volume 29(3), 40-46, www.iosrjournals.org
- Ali, G.K., Wan, M.B.W.J. & Nobaya, B.A. (2017). Relationship Between Academic Self-Efficacy Belief of College Students and Academic Performance. *Iosr Journal of Humanities and Social Science*, 22(1), 75-80.
- Asanre, A. A. (2023) Dimensions of students' academic engagement as predictors of Learning outcomes in senior secondary school mathematics, (An Published PhD Thesis) Department of Science and Technology Education, Olabisi Onabanjo University, Ago Iwoye, Ogun State, Nigeria
- Asanre, A. A., Aviwe, S., Ogunyale, A., Olusola, G., & Sottin, D. (2024). Effect of integrating YouTube as a teaching tool on the academic achievement of senior secondary school students in mathematics. *FNAS Journal of Mathematics and Science Education*, 5(2), 82-86
- Asanre, A.A., Abiodun, T.O., Olaniyan, J.S., Olusola, G.S., & Ogunmokun, T. M. (2023). Predicting academic achievement using mathematics anxiety among senior secondary school students. *TASUED Journal of Pure and Applied Science*, 2(1),136-142, <https://journals.tasued.edu.ng/index.php/tjopas>

- Badamasi, M., Sale, M. & Mudi, F. I. (2024) Personality Traits and Self-Efficacy As Predictors Of Academic Performance Of English Senior Secondary School Students In Katsina Metropolis, Katsina State, Nigeria. *International Journal of Innovative Psychology & Social Development* 12 (1):35-51, www.seahipublications.org
- Bandura, A. (2010). Self-Efficacy. In I. B. Weiner & W. B. Craighead (Eds.), *The Corsini Encyclopedia of Psychology* (4th Ed.). John Wiley & Sons.
- Bentil, J. (2023) Study Habits and Academic Performance Among Public Junior High School Students in the Ekumfi District: Investigating the Controlling Effect of Learning Styles. *European Journal of Social Science Studies*. Vol. 8(6), 187 - 206
- Castillo, A. I., Faith, C., Bartolome, A. J., Pascual, P. G. S., Villarta, R. O. & Jhoselle T. (2023) The Impact of Study Habits on the Academic Performance of Senior High School Students Amidst Blended Learning. *Psychology and Education: A Multidisciplinary Journal*. 10, 483-488. DOI: 10.5281/zenodo.8122328
- Ifamuyiwa A. S, Abiodun, T. O. & Asanre, A. A. (2018). Students' Representation ability in some secondary school Mathematics themes involving word problems as related to achievement in Mathematics. *Journal of Science Teachers Association of Nigeria*, 53, 125-135.
- Jafari, H., Aghaei, A. & Khatony, A. (2019) Relationship between study habits and academic achievement in students of medical sciences in Kermanshah-Iran. *Advances in Medical Education and Practice*. V. 10, 637–643
- Kamau, D. N., & Lucy Mawang, L. (2023). Academic self-efficacy and locus of control as correlates of pupils' mathematics performance in public primary schools in Nyandarua County, Kenya. *Reviewed Journal of Social Science & Humanities*, 4 (1), 594 – 593
- Odiri, O. (2020). Relationship between students' self-efficacy and their achievement in senior secondary school mathematics, Delta Central Senatorial District, Nigeria. *International Journal of Education and Research*, 8(5), 35-42. www.ijern.com
- Okoli, J.N. & Emenike, O.E (2023) Self-Efficacy and Study Habit as Predictors of Secondary School Students' Interest in Biology in Nsukka Education Zone. *International Journal of Research Publication and Reviews*, Vol 4, no 11, pp 2632-2638. www.ijrpr.com
- Okoli, C. S. & Okigbo, E. C. (2021). Effects Of Cooperative Learning Strategy And Inquiry Based Learning On Secondary School Students' Academic

Achievement In Chemistry In Nnewi Education Zone, International Journal Of Innovative Research And Advanced Studies (Ijiras),8 (5)

- Onoshakpokaiye, E. O. (2020) Relationship Between Students' Self-Efficacy and their Achievement in Senior Secondary School Mathematics, Delta Central Senatorial District, Nigeria. *International Journal of Education and Research* Vol. 8 No. 5, 33 - 42
- Ozioko, S. U (2019) students Variables as predictors of academic achievement in Biology in senior secondary schools, Imo State, Nigeria. Unpublished PhD Thesis, Department of Science Education University of Ilorin, Ilorin, Kwara State, Nigeria.
- Reylan, C., Renante, N., Jonathan, O. E., Raymond, E., Gengen, P. & Ramil, M. (2019) Attitudes, Study Habits, and Academic Performance of Junior High School Students in Mathematics. *International Electronic Journal Of Mathematics Education*. Vol. 14, No. 3, 547-561
<https://doi.org/10.29333/iejme/5768>
- Schenkel B. D. (2020) The impact of an attitude toward mathematics and mathematics Performance [Internet].
- Tus, J. (2020) The Influence of Study Attitudes and Study Habits on the Academic Performance of the Students. *IJARW | ISSN (O) - 2582-1008* October 2020 | Vol. 2 Issue. 4, Available at SSRN: <https://ssrn.com/abstract=3717274>
- Udegbe, S. I.& Okoli, J. N. (2022) Self-Efficacy, Study Habit and Attribution Style As predictors of Senior Secondary School Students' Interest in Biology in Ogidi Education Zone. *IOSR Journal of Research & Method in Education*, Volume 12, Issue 1, 46 – 52. www.iosrjournals.org
- Woji, M. & Charles-Ogan, G. (2022). Ethnomathematics And Academic Performance Of Senior Secondary Students In Mathematics In Rivers State, Nigeria. *International Journal Of Trend In Scientific Research And Development*, 6(2), 1156-1161
- Yesuf YM, Kebede SA, Zewdu A and Gebru DM (2023) Predictors of high school students' mathematics self-efficacy in Addis Ababa: The importance of educational expectations. *Front. Psychol.* 13:927757.doi: 10.3389/fpsyg.2022.927757