

Short Paper

Relationship Between Students' Self-efficacy, Gender and Academic Achievement in Information and Communication Technology in Anambra State

JohnBosco O.C. Okekeokosisi
Department of Computer Education,
Federal College of Education (Technical) Asaba, Delta State, Nigeria,
gentelejack10@yahoo.com
(corresponding author)

Nkechi T. Nchikwo
Department of Computer and Robotics Education,
Nwafor Orizu College of Education Nsugbe, Anambra State, Nigeria

Peace O. Ezze
Department of Computer Education,
Federal College of Education (Technical) Asaba, Delta State, Nigeria
peaceezzeh@gmail.com

Date received: July 4, 2023

Date received in revised form: July 25, 2023; September 5, 2023

Date accepted: September 15, 2023

Recommended citation:

Okekeokosisi, J.B.O.C., Nchikwo, N.T., & Ezze, P. O. (2023). Title. *International Journal of Computing Sciences Research*, 7, 2478-2488.
<https://doi.org/10.25147/ijcsr.2017.001.1.169>

Abstract

Purpose – The need to ascertain if there is any other factor responsible for the poor achievement of students in ICT necessitated the study. This study aimed to investigate the relationship between students' self-efficacy, gender, and their academic achievement in ICT in Anambra State.

Methods – The design of the study was a correlational survey research design. The study was guided by three research questions and three null hypotheses. The study was carried out in co-educational schools of two selected education zones that are among the six education zones in which ICT as a subject was offered in external examination and are co-



educational public schools. The sample of the study consists of 473 senior secondary two (SS2) ICT students drawn from schools from two education zones that offer ICT in WAEC. The general self-efficacy instrument of Schawarzar and Mathias (1979) was adopted by the researchers. The reliability coefficient of 0.76 to 0.90 was used. Person's product-moment correlation coefficient was used to answer the research questions while multiple regression was used to test the null hypotheses.

Results – The result of the study revealed that there was a significant positive relationship between secondary school students' self-efficacy and their academic achievement in ICT. The study further revealed that there was a substantial positive relationship between male secondary school students' self-efficacy and their academic achievement in ICT. It equally shows that there was a significant moderate positive relationship between female secondary school students' self-efficacy and academic achievement in ICT.

Conclusion – Self-efficacy plays a major role in the academic achievement of students in ICT and should not be neglected to improve the academic achievement of students in ICT.

Recommendation – Based on these findings, the researchers recommended among others that ICT teachers should encourage students in self-ability through hands-on, minds-on activities for self-reliance, self-development, and societal advancement.

Research Implications – The research implications are that learners are drilled on hands-on, minds-on activities for individual development.

Keywords – self-efficacy, gender, academic achievement

INTRODUCTION

Functional education has become a great challenge to every individual due to the increasing effect of globalization, the complexity of technology, and societal crises. Currently, education trends towards digitalization of pedagogical skills in which educators or teachers are the hub of the system, though learners remain the central focus. Ifelunni (2014) defined who a teacher is and his function. A teacher has acquired the requisite content and pedagogical skills needed to facilitate learning. The functions of a teacher as listed by Ifelunni (2014) include being a facilitator of learning, a motivator, a guidance counselor, and a role model inspiring the students. Teachers are the major indicator and determinant of quality instruction. Teacher's productivity is effective when learners are productive and contribute to the development of the society.

However, several factors have been identified by researchers, educators, and examination bodies as being responsible for the persistent poor performance of students in senior secondary school certificate examinations. Some of these factors include teaching methods, terminology, lack of qualified teachers, peer influence, economic

factors, internal state, and environmental problems, problems caused by parents, low funding of the education sector, large class size, self-concept, self-efficacy belief, and gender. Yet, one still notices poor academic achievement in information and communication technology (ICT). This could be because the relationship that exists between some of these variables identified may have not been ascertained. It therefore becomes imperative to examine the relationship that exists between students' self-efficacy and gender as related to their academic achievement in ICT.

Self-efficacy is a social cognitive theory of Bandura that focuses on individual judgment of their capabilities to execute a course of action required to achieve desired performance. Kirk (2023) viewed self-efficacy as the belief in one's ability to achieve a good or an outcome. It encompasses a person's confidence in themselves to control their behavior, exert an influence over their environment, and stay motivated in the pursuit of their goal. Self-efficacy is important because it plays a role in how an individual feels about himself and whether or not successfully achieves one's goals in life.

Achievement according to Hornby (2010) means accomplishment. It is a measure of knowledge gained in formal education (Udegbe & Okoli, 2022). It is usually indicated by test scores, grade points, averages, and degrees. This means that the achievement level of the students is judged by marks that the students have scored in an examination. Achievement test helps the teacher and students to evaluate and estimate the degree of success attained in learning a given concept (Akachukwu & Okoli in Anazor & Achufusi-Aka, 2023). It is very disheartening to note that students' performance in ICT at the external examination as reviewed by WAEC Chief Examiner's reports of 2017-2019 revealed persistent poor performance, inability to write ICT terms and keywords correctly, failure to follow the instructions on the question paper with regards to the number of questions to be answered, spelling mistakes, lack knowledge of the function of registers, confuse between the computer register and attendance register and so on. This report was supported by other research conducted by researchers like Eze (2019), Okoh (2020) and Okeke (2021). Their findings still indicate poor performance in external examination in ICT. Given this, Oki, Uleanya, and Mbanga (2023) suggested that certain measures should be put in place by the government and educators for high achievement in the subject. Such measures suggested by Oki, Uleanya, and Mbanga (2023) were proper funding of education by the government, and curbing gender inequality through proper sensitization, training, and re-training of teachers.

ICT is an abbreviation for information and communication technology. UNESCO (2009) defined ICT as a diverse set of technological tools and resources used to transmit, store, create, share, or exchange information. It is the use of computing and telecommunication technologies, systems, and tools to facilitate the way information is created, collected, processed, transmitted, and stored (Rouse, 2023). The goal of ICT is to improve access to information and make human-to-human, human – to- machine and machine-to-machine communication easier and more efficient. FAO (2023) added that ICT is media applications and services that enable learning and information access, retrieval, storage, transmission,

and manipulation of information in a digital form. Since the inception of the newly reviewed national policy on education in 2013, ICT has been made a compulsory subject depending on the student's area of study. Through the knowledge of ICT, learners understand its application in their daily activities. It is based on its relevance in human life that learners are expected to manifest a high level of achievement. It is on this note that this study seeks to examine the relationship that exists between ICT academic achievement and gender.

Gender refers to sets of relationships, attributes, roles, beliefs, and attitudes that define what being a man or woman is within society. This is verifiable because there is a general belief among Nigerians that males are superior to females in terms of physical physique, cognition, logical reasoning, and even academic achievement (Okekeokosisi, 2021). In view, Harrison and Yalew (2014) in their study on the relationship between male and female students' self-efficacy and academic achievement in biology among grade ten students in south zone Wolo schools in Ethiopia found that there was a statistically significant difference between male and female students self-efficacy and academic achievement in biology which was in favor of the males. Rudina (2013) in his study on the relationship between self-efficacy and academic performance in the context of gender among Albanian students reported that there was also a significant difference between male and female academic performance. On the contrary, Hayat, Shateri, Amini, and Shokrpour (2020) found that students who believed in their abilities gender notwithstanding had more positive emotions and used more metacognitive learning strategies, resulting in better academic performance.

However, most of these studies were not carried out in Nigeria and they were not in ICT. It is against this background of thought that this study was conducted to find out the relationship between self-efficacy, gender, and academic achievement of ICT students in Otuocha Educational Zone of Anambra State.

STATEMENT OF THE PROBLEM

Students' poor achievement in ICT has drawn the attention of researchers, curriculum planners, textbook writers, and society at large towards ICT as a school subject. Empirical studies have indicated that several factors such as the employment of unqualified teachers as ICT teachers, the use of ICT textbooks that are not written and edited by a graduate of ICT (ICT professionals), school-based factors (availability and the use of teaching-learning facilities, poor methods of teaching), family background, socio-economic factors (anxiety, motivation, attitude, and peer group), school type (public or private), school or classroom environment, overload of the syllabus and excess subjects introduced in the curriculum are factors attributed to being causes of poor achievement in science, vocational, technical subjects and ICT inclusive. Therefore, there is a need to conduct research work to ascertain if there is any other factor responsible for this poor achievement of students in ICT. This study aimed to investigate the relationship between students' self-efficacy, gender, and their academic achievement in ICT in Anambra State.

Purpose of the study

The purpose of this study was to find out the relationship among secondary school students' self-efficacy, gender, and academic achievement in ICT. Specifically, the study sought to determine;

1. Relationship between secondary school students' self-efficacy and their academic achievement in ICT
2. Relationship between male secondary school students' self-efficacy and their academic achievement in ICT
3. Relationship between female secondary school students' self-efficacy and their academic achievement in ICT

Research Questions

The following research questions guided the study;

1. What is the relationship between secondary school students' self-efficacy and their academic achievement in ICT?
2. What is the relationship between male secondary school students' self-efficacy and their academic achievement in ICT?
3. What is the relationship between female secondary school students' self-efficacy and their academic achievement in ICT?

HYPOTHESIS

The following null hypotheses were formulated and tested at $p < 0.05$;

Ho₁: There is no significant relationship between students' self-efficacy and their academic achievement in ICT

Ho₂: There is no significant relationship between male secondary school students' self-efficacy and their academic achievement in ICT

Ho₃: There is no significant relationship between female secondary school students' self-efficacy and their academic achievement in ICT

METHODOLOGY

Research Design

The study adopted a correlational survey research design.

Population and Area of the Study

The population consists of 2412 students offering ICT as a subject in the WAEC external examination in six educational zones. A purposive sampling technique was used to select co-educational secondary public schools that offer ICT in external examination from two education zones out of the six education zones in the state. Simple random sampling techniques balloting without replacement were employed to select 10 public co-

educational schools from two education zones where ICT as a subject was offered. Two zones were selected out of six zones in which the co-educational schools offer ICT as a subject in external examination. Thus, 10 schools from the two education zones were selected and used for the study.

Sample and Sampling Technique

The sample size consists of 473 senior secondary two (SS2) ICT students; 200 males and 273 females drawn from two education zones that offer ICT as a subject in external examination. The two zones selected and used were the Otuocha and Onitsha zones.

Instrument for Data Collection

The researchers adopted Schawarzar and Mathias's (1979) general self-efficacy instrument.

Reliability of the Instrument

The reliability of the instrument was established using Cronbach's alpha and the internal consistency ranged from 0.76 to 0.90. Pearson's product-moment correlation coefficient was used to answer the research questions while multiple regression was used to test the hypotheses. Based on this, the coefficient (r) and the size of the relationship were interpreted using the interpretation of a correlation coefficient by Best and Khan (2003). Best and Khan's interpretations are as follows; .00 to .20 – negligible, .20 to .40 – low, .40 to .60 – moderate, .60 to .80 – substantial, and .81 to 1.00 – very high.

RESULTS

Research Question 1: What is the relationship between secondary school students' self-efficacy and their academic achievement in ICT?

Table 1. Pearson's correlation between self-efficacy and academic achievement in ICT

Variables	N	Self-efficacy	ICT achievement	Remark
Self-efficacy	473	1	.53	Moderate positive relationship
ICT achievement	473	.53	1	

Table 1 indicates that there is a moderate positive correlation between self-efficacy and ICT achievement. This is shown by the size of Pearson's correlation coefficient, $r = .53$.

Research Question 2: What is the relationship between male secondary school students' self-efficacy and their academic achievement in ICT?

Research Question 3: What is the relationship between female secondary school students' self-efficacy and their academic achievement in ICT?

Table 2. Pearson's Correlation between male and Female Secondary School Students' self-efficacy and Their Academic Achievement in ICT

Gender		N	Self-efficacy	ICT achievement	Decision
Male	Self-efficacy	200	1	.62	Substantial positive relationship
	ICT achievement	200	.62	1	
Female	Self-efficacy	273	1	.50	Moderate positive relationship
	ICT achievement	273	.50	1	

The analysis in Table 2 shows that there is a substantial positive relationship between self-efficacy and ICT achievement for males. This is shown by the size of Pearson's correlation coefficient r which is .62. Furthermore, there exists a moderate positive relationship between self-efficacy and ICT achievement for females as shown by the size of Pearson's correlation coefficient r which is .50. Based on sizes of the relationship, .62 for males and .50 for females. This shows a stronger relationship in males than females.

Hypothesis 1: There is no significant relationship between students' self-efficacy and their academic achievement in ICT.

Table 3. Test of significance of the relationship between students' self-efficacy and their academic achievement in ICT

Variable	N	R	B	Beta	Df	T	p-value	Remark
Self-efficacy	473	.53	1.15	403	471	8.25	.00	Significant

Data in Table 3 shows that self-efficacy contributed to 40.3% of achievement in academic achievement in ICT. The Pearson's Correlation Coefficient, $r(473) = .53$, $p < 0.05$, $t = 8.3$. Since self-efficacy contributed 40.3% of academic achievement in ICT and the p-value was less than the stipulated level of significance, there is a significant relationship

between self-efficacy and academic achievement in ICT. Therefore, the null hypothesis was rejected.

Hypothesis 2: There is no significant relationship between male secondary school students' self-efficacy and their academic achievement in ICT

Hypothesis 3: There is no significant relationship between female secondary school students' self-efficacy and their academic achievement in ICT.

Table 4. Test of significance of Pearson's Correlation between male and female secondary school students' self-efficacy and their academic achievement in ICT

Gender		N	Self-efficacy	ICT achievement	Decision	Remark
Males	Self-efficacy	200	1	.62	High positive relationship	Significant
	ICT achievement	200	.62	1		
Females	Self-efficacy	273	1	.50	Moderate positive relationship	Significant
	ICT achievement	273	.50	1		

Table 4 points out that there is a significant relationship between self-efficacy and ICT achievement. For males, $r(200) = .62$ and $p\text{-value} < 0.05$ but for females $r(273) = .50$, $p\text{-value} < 0$. There exists a significant relationship between self-efficacy and ICT achievement. Therefore hypotheses 2 and 3 were rejected.

DISCUSSION

The findings of the study revealed that there was a significant moderate positive relationship between secondary school students' self-efficacy and academic achievement in ICT. The findings are in line with the study conducted by Meral, Colak, and Zereyak (2012) which points out that students trained to have higher self-efficacy beliefs have improved academic performance. This implies that students with strong senses of self-efficacy tend to be involved in challenging tasks, invest more effort, and persistence, and show excellent academic performance in comparison with students who lack such confidence. Students who have little self-efficacy consider tasks to be unnecessary and

may not spend time and energy on them. This agrees with the idea of Kirk (2023) who opined that self-efficacy is one's ability to achieve a goal.

The researchers found that there is a substantial positive relationship between male secondary school students' self-efficacy and academic achievement in ICT. Such findings apply to the females. The findings further x-rayed that male students with high self-efficacy achieve higher than females with low self-efficacy. This is in line with the opinion of Hayat, Shateri, Amini, and Shokrpour (2020) who found that students who believed in their abilities gender notwithstanding had more positive emotions and performed better in academics.

CONCLUSION

The study concluded that there is a significant relationship between students' self-efficacy and their academic achievement in ICT irrespective of gender. This implies that self-efficacy plays a major role in the academic achievement of students in ICT and should not be neglected to improve the academic achievement of students in ICT.

RECOMMENDATIONS

The findings of the study suggest that curriculum planners should make provision for hands-on, minds-on activities in planning and reviewing ICT curricula. They should recommend to the government and organize seminars and workshops periodically for ICT teachers. Moreover, the government should fund materials and facilities for learning ICT in schools. Lastly, the government should encourage ICT teachers by offering them scholarships and in-service training.

SUGGESTION FOR FUTURE RESEARCH

This study was restricted to some secondary schools in only two education zones of a state and only a few factors were investigated. The researchers made the following suggestions: (1) the study be replicated in more secondary schools in more states, (2) factors other than the ones investigated should be studied, and (3) further research on the factors affecting secondary school students' achievement in ICT.

PRACTICAL OR THEORETICAL IMPLICATIONS

The study was carried out in only two education zones of Anambra State. The study would have had more power to detect how related students' self-efficacy, gender, and academic achievement were in information and communication technology if there were more respondents from several zones in more states. The findings imply that teachers should encourage gender equality by providing equal opportunity for both male and female students in active participation in learning activities, guiding them to inculcate self-confidence in themselves.

However, the findings of this study have obvious educational implications. The use of hands-on, minds-on activities in this study has proved to be effective in facilitating students' self-efficacy concerning their academic achievement in ICT. Though the teachers used for this study may not have been sufficient for the expected level of teacher effectiveness, the students still ensure greater learning achievement.

ACKNOWLEDGEMENT

The researchers wish to thank the authors that are cited in this work. They equally wish to thank the Journal committee that facilitates the running of this Journal.

DECLARATION

Conflict of Interest

The researcher declares no conflict of interest in this study.

Informed Consent

The researchers followed ethical practices in the conduct of this study.

Ethics Approval

Ethics approval is not required.

REFERENCES

- Anazor, N.E. & Achufusi-Aka, N.N. (2023). Effect of problem-based learning approach on academic achievement of secondary school physics students in Ogidi education zone. *SEJRSD*, 11(1), 34-54.
- Chief Examiners Report (2017-2019). *West African senior secondary certificate examination*. Awka, Anambra State.
- FAO (2023). *Information and communication technologies*. Retrieved on 10th June 2023 from [aims.fao.org/information and communication technology](https://aims.fao.org/information-and-communication-technology).
- Hayat, A.A., Shateri, K., Amini, M. & Shokrpour, N. (2020). Relationship between academic self-efficacy, learning-related emotions, and metacognitive learning strategies with academic performance in medical students: a structural equation model. *BMC Medical Education*, 20(76); 1-11.
- Hornby, A.S. (Ed) (2010). *Oxford Advance learners' dictionary* (8th ed). Oxford University.
- Ifelunni, C.S.I. (2014). *Teacher education today for Nigeria tomorrow. Matriculation Lectures*. Federal College of Education (Tech) Asaba, Delta State.
- Kirk, K. (2023). Student motivations and attitudes: The role of the affective domain in Geoscience learning. <https://sere.carleton.edu/NAGTworkshops/affective/efficacy.html>

- Meral, M., Colak, E. & Zereyak, E. (2012). The relationship between self-efficacy and academic performance. *Procedia Social and Behavioral Sciences*, 46, 1144-1146.
- UNESCO (2009). *Information and communication technologies*. Retrieved learning portal.iiep.unesco.org
- Okekeokosisi, J.O.C.(2021). Effect of activity-based instructional strategy on secondary school student's achievement and interest in computer studies in Awka education zone. Unpublished M.SC. thesis. Nnamdi Azikiwe University, Awka.
- Oki, O.A., Uleanya, C. & Mbanga, S. (2023). Echoing the effect of information and communication technology on rural education development. *Technology Audit and Production Reserves*, 112 (69); 1-10.
- Rouse, M. (2023). Information and communication technology. Retrieved on 10th June 2023 from <http://searchcio.techtarget.com/definition/ICT-information-and-communications-technology-or-technologies>.
- Rudina, S. (2013). The relationship between self-efficacy and academic performance in the context of gender among Albanian students. *European academic research*, 4(1), 467-498.
- Schwarzer, R. & Mathias, J. (1979). *General self-efficacy instrument*. Windsor, UK: NFER-NELSON.
- Schorlarzar, R. & Malkies, J. (1979). General self-efficacy scale (GSE). Frees University Berlin psychology. Retrieved on 10th June 2023 from <http://inserpage.Fu-herlin.de/health/engscal.htm>.
- Udegbe, S.1. & Okoli, J.N. (2022). Self-efficacy, study habit, and attribution style as predictors of senior secondary school students' achievement in Biology in Ogidi education zone. *African Journal of Science, Technology and Mathematics Education*, 8(1), 91-98.

Author's Biography

Johnbosco O.C. Okekeokosisi MSTAN is a lecturer in the Computer Education Department, School of Secondary Education (Science) at Federal College of Education (Technical) Asaba, Delta State, Nigeria. He has published around 30 articles in international publications, local publications, and book chapters. He has written and published many textbooks.

Nkechi T. Nchikwo is a staff of Nwafor Orizu College of Education Nsugbe, Anambra State, Nigeria.

Peace O. Ezzeh is a lecturer in the Computer Education Department, School of Secondary Education (Science) at Federal College of Education (Technical) Asaba, Delta State, Nigeria.