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SELF-EFFICACY AND ACADEMIC ACHIEVEMENT OF BIOLOGY STUDENTS IN OWERRI EDUCATION ZONE OF IMO STATE

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Keywords: *Biology, Self-Efficacy, Gender and Academic Achievement*

Abstract: *The study examined self-efficacy and academic achievement of biology students in owerri education zone of imo state. The target population for the study was all the public secondary school in the zone. The sample for the study was 1006 biology students in Owerri education zone drawn using purposive sample technique. Two research questions and two hypotheses guided the study. Two instruments were used to elicit the relevant data. One was named Self Efficacy Inventory for Biology students (SEIBS) is a 15-item inventory adapted from Ibe (2012) and the Biology Terminal Results (BTR) which is a standard terminal result gotten from biology teachers from the selected schools. SEIBS was validated by three expects a reliability of .68 was obtained after pilot study indicating that the instrument was reliable. The data collected were analysed using Pearson's Product Moment Correlation for both research questions and hypotheses which was tested at .05 level of significance. The results revealed that: there is a positive and very low relationship between secondary school students' self- efficacy and their academic achievement in biology. Hence there is no significant relationship between students' self - efficacy and their academic achievements in biology. Also there is a positive and very low relationship between secondary school students' self- efficacy and their academic achievement in biology when moderated by gender. Hence there is a significant relationship between students' self-efficacy and their academic achievement in biology when moderated with gender. From the findings it was concluded that there is a positive and very low relationship between secondary school students' self-efficacy and their academic achievement in biology. Hence there is no significant relationship between students' self-efficacy and their academic achievements in biology. Also, there is a positive and very low relationship between secondary school students' self-efficacy and their academic achievement in biology when moderated by gender. Hence there is a significant relationship between students' self-efficacy and their academic achievement in biology when moderated with gender. It was recommended among others that students should be allowed to take part in decision making so as to harness their self- efficacy which will in turn boost their academic achievement, school administrators should encourage gender equality among students to avoid lack of confidence, interest and effort. Also that parents should encourage their wards (especially males) on the need to have positive belief that they can perform better in Biology. This can be done by living by example, and allow them participate in decision making at home.*

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Introduction

The world is fast becoming more scientific in thinking and behaviours that without good knowledge of science, it might be difficult for people to adequately function in it. The purpose of exposing children to science instruction right from primary school level is not necessarily to turn them into scientists per se but to enable them acquire the right scientific attitudes and to be able to raise questions about things that intrigue them (Dayal, 2013). In line with the views of Uzoechi and Adejoh (2014), any nation that neglects the teaching and learning of science in her schools does so at the risk of remaining underdeveloped. The need for science as an indispensable tool for a nations' overall sustainable development can hardly be over-emphasized.

Certain factors militate against students' achievement in Biology. These factors are both students based and teacher-based factors. Among the students'-based factors are self-efficacy, self-esteem, study habit, attitude, interest and so on. This study focused on the relationship between students' self-efficacy and achievement in biology.

According to Dell (2000), self- efficacy is a person's judgment about being able to perform a particular activity. It is a student's "I can" or "I cannot" belief. Students with low self- efficacy do not expect to perform well on academic tasks and often do not achieve at a level that is commensurate with their abilities. They do not believe they have the skills and abilities to do well hence they do not make much effort to achieve a set goal. The connection between self- efficacy and achievement gets stronger as students advance through school. It is important to help learners to build a high self- efficacy in order to attain high achievement in academic tasks. Self-efficacy has been defined as personal judgments of one's capabilities to organize and execute course of action to attain designated types of educational performance (Li, 2012). Interestingly, Nwosu and Okoye (2014) defined self-efficacy as an important psychological construct which requires attention in research as it influences; the choice of activities that an individual takes part in; the amount of effort expended in performing a task and how long one perseveres in the face of stressful situations in completing the task.

In the past years, researchers like Eastman and Marziller, Kazdin, Teasdale in Pajares (2004) had argued that in many cases of self- efficacy, judgments are themselves dependent on outcome expectations and that Bandura (1977) oversimplified the relationship between the two constructs; self-efficacy beliefs and outcome expectations. Bandura argued that it is also possible to exclude considerations of outcomes from judgments of personal efficacy (Pajares, 2004). Pajares further stated these four sources of self- efficacy: enactive mastery experience, vicarious experience, verbal persuasion and physiological and emotional states. In all, self-efficacy refers to the confidence people have in their abilities that they will be successful at a

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given task not minding their gender.

Gender is an important variable in educational research and it has continued to be an issue of concern to educators and researchers. Gender can be considered to be sexual classification into male and female. It could also mean the society-constructed roles, responsibilities ascribed to male and female by different societies (West Minister Institute of Education, 2006). According to Obasi (2004), gender is referred as many social and cultural constructed characteristics, qualities, behavior and roles which different societies ascribed to male and female. Gender is different from sex because sex describes the biological determined physical distinction between male and female which is universal (Ironkwe, 2008) Related issues to gender here become vital in the field of educational research.

Different professions demand different academic qualifications and people are selected according to their achievements and merits. Academic achievement is the pivot and centre of educational growth and development. It encourages the student to work hard and learn more and choose the right course (Nwosu & Okoye, 2014). It also aids the teacher in grouping the students. In this present world of industrialization and globalization, the educational status of an individual is largely assessed through the academic achievement.

Nwosu and Okoye (2014) established the predictive power of students' self- efficacy and self- rating scores on undergraduate students' academic achievement in a psychology course (psychology of learning). Findings showed that self-efficacy and self- rating scores when combined together using multiple regression could not predict significantly students' academic achievement using self-efficacy theory (SET) (Bandura,1977). Similarly, Zimmerman et al. (1992) maintained that academic self- efficacy significantly influenced academic success. More so, Li (2012) studied the relationship between social science students' attitude towards research methods and statistics, self- efficacy, effort and academic achievement in the City University of Hong Kong. Findings revealed that academic self-efficacy (r (153) =0.683) was statistically significant and strongly correlated with effort.

Tenaw (2013) observed that there is no significant relationship in students' self- efficacy and gender, indicating that gender was not a contributing factor/ determinant in academic achievement of student. Odiri (2010) revealed that there is significant relationship between self-efficacy and gender. Zimmerman et al. (1992) also reported a significant relationship between male and female students' self-efficacy and their academic achievement in science subjects.

From the forgoing, it can be deduced that many students are eager to learn and willing to tackle new challenges while others seem uninterested or unmotivated. Some students demonstrate high level of confidence in their abilities (high self- efficacy) while others seem unsure of their capabilities to accomplish a given task (low self-

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efficacy). This raises doubt as to whether there are such intrinsic learner factors as study habits and self- efficacy that inhibit the psychological and cognitive processes in biology. This is informed by the fact that academic achievement rests more upon knowing how to understand and remember than upon any other competing factors in learning as earlier cited.

So, there have been inconsistencies in contemporary understanding on the relationship between self- efficacy and achievement. Yet, most of the existing studies stated that there was a strong correlation between the two variables, there were still studies arguing the opposite. Thus, there was need to demonstrate a clearer understanding between the variables, so as to unravel the mystery behind the continued poor academic achievement of students in biology in Imo state. Against this backdrop, this study investigated self-efficacy and secondary school students' achievement in biology in Owerri education zone of Imo state.

This study determined the following:

1. The relationship between students' self-efficacy and their academic achievement in biology
2. The relationship between students' self-efficacy and their academic achievement in biology as moderated by gender

Research Questions

The following research questions guided the study

1. What is the relationship between students' self-efficacy and their academic achievement in biology?
2. What is the relationship between students' self- efficacy and their academic achievement in biology as moderated by gender?

Hypotheses

H_{O1}: There is no significant difference in relationship between students' self-efficacy and their academic achievement in biology.

H_{O2}: There is no significant difference in relationship between students' self- efficacy and their academic achievement in biology as moderated by gender.

Methodology

The study employed a correlation research design. This design seeks to establish the relationship that exists between two or more variables. The area of the study was Owerri education zone in Imo state Nigeria. The population of the study comprised of 1006 Senior Secondary class 2 students drawn from 5 public schools using purposive sampling technique to take care of gender.

Instrument

Two instruments were used for data collection namely: Self Efficacy Inventory for Biology students (SEIBS) is a 15-item inventory adapted from Ibe (2012) and the Biology Terminal Results (BTR) of the students in their schools approved by the school management board. For Study Habits Inventory for Biology Students (SEIBS), Face Validation was carried out by five experts comprising of one from Guidance and Counselling (G & C) Department Nnamdi Azikiwe University Awka (UNIZIK), an

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experienced secondary school biology teacher from Imo state, two experts from Measurement and Evaluation from UNIZIK and Imo state university Owerri (IMSU) and one expert from Science Education Department IMSU. The comments and suggestions of these experts were incorporated into the final draft of the instrument. The instrument SHIBS was administered to 30 SS 2 biology students of another school outside the population using Cronbach Alpha which yielded a value of .68 indicating the instrument is reliable. The second instrument is Biology Terminal Results (BTR). It is a standardized instrument hence, did not undergo the test of reliability. Data for the study were collected during the second term of the secondary school academic session. Each of the schools commenced normal class teachings during the first term. After the first term biology examination, the Biology Terminal Results (BTR) was obtained from the biology teachers. The researchers with the assistance of the biology teachers administered the instruments in each of the sampled schools. Data generated with these instruments was analyzed using person moment correlation to answer and test the hypothesis as below:

Ranges of scores	**Decision**
±0.80 – ± 1.00	High positive or negative relationships
±0.31 – ± 0.79	Moderate positive or negative relationship
±0.00 – ± 0.30	Low positive or negative relationship for research question and ($p<.05$) for hypotheses.

Results

Research Question 1: What is the relationship between students' self-efficacy and their Academic achievement in biology?

Table 1: Pearson Correlation Coefficient for the Relationship between Students' Self-Efficacy and their Academic Achievements in Biology

Variables	N	r	R^2	Magnitude & Direction	Sig	Decision
Study habit		1.00	0.12	Positive and very low	0. 06	Not Significant
Achievement	1006	0.12	1.00	relationship		

Key: R^2 = coefficient of determination.

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Table 1 reveals correlation coefficients of the relationship between secondary school students' self-efficacy and their academic achievement in biology as 0.12. This means there is a positive and very low relationship between secondary school students' self-efficacy and their academic achievement in biology in Owerri education zone in Imo state Nigeria. The coefficient of determination (1) also known as the relationship value means that 10% of secondary school students' self -efficacy accounted for variation in their academic achievement in biology. This is an indication that 90% of variation in secondary school biology students' academic achievement is attributed to other factors other than their self -efficacy.

Research Question 2: What is the relationship between students' self- efficacy and their academic achievement in biology as moderated by gender?

Table 2: Pearson Correlation Coefficient for the Relationship between Students' Study Habits and their Academic Achievements in Biology when Moderated with Gender

Variables	N	r	R^2	Magnitude & Direction	Sig	Decision
Study habit				Positive and very low	0. 04	Significant
Achievement	1006	0.18	0.19	relationship		

Key: R^2 = coefficient of determination.

Table 2 reveals correlation coefficients of the relationship between secondary school students' self-efficacy and their academic achievement in biology when moderated with gender as 0.18. This means there is a positive and very low relationship between secondary school students study habit and their academic achievement in biology when moderated by gender in Owerri education zone in Imo state Nigeria. The coefficient of determination (.19) also known as the relationship value means that 19% of secondary school students' self- efficacy accounted for variation in their academic achievement in biology when moderated by gender. This is an indication that 81% of variation in secondary school biology male and female students' academic achievement is attributed to other factors other than their self -efficacy.

Hypotheses

H_{O1}: There is no significant difference in relationship between students' self-efficacy and their academic achievement in biology.

Table 1 revealed the Pearson correlation coefficient for the relationship between students'

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self-efficacy and their academic achievements in biology. A positive very low relationship was found r = (1006). p=0.00>0.05) indicating a no significant relationship between the two variables. The null hypothesis which stated that there is no significant relationship between students' self-efficacy and their academic achievements in biology was there uphold. The inference drawn was that the high students' self-efficacy the higher their achievement in biology concept.

H_{O2}: There is no significant difference in relationship between students' self- efficacy and their academic achievement in biology as moderated by gender.

Table 2 revealed the Pearson correlation coefficient for the relationship between students' self- efficacy and their academic achievement in biology when moderated with gender. A positive very low relationship was found r = (1006) .18 p=0.00<0.05) indicating a significant relationship between the two variables. The null hypothesis which stated that there is no significant relationship between students' self-efficacy and their academic achievement in biology when moderated with gender was therefore rejected. The inference drawn was that there is a significant relationship between students' self- efficacy and their academic achievement in biology when moderated with gender.

Discussion of Results

The findings of the study are discussed as follows

1. The relationship between students' self-efficacy and their academic achievement in biology
2. The relationship between students' self-efficacy and their academic achievement in biology as moderated by gender

The relationship between students' self-efficacy and their academic achievement in biology

Findings have shown that there is a positive and very low relationship existing between the students' self-efficacy and their academic achievements in biology. Hence, no significant relationship exists. The finding is in consonance with Nwosu and Okoye (2014) who established that predictive power of students' self- efficacy and self- rating scores on undergraduate students' academic achievement in a psychology course (psychology of learning). More so, that self-efficacy and self- rating scores when combined together using multiple regression could not predict significantly students' academic achievement using self-efficacy theory (SET) (Bandura,1977). In contrary, the finding is not in line with Zimmerman et al. (1992) reported that a significant relationship exists between students' self- efficacy and their academic achievement. By virtue of this finding, this research has joined the school of thought that relates a positive and very low relationship between students' self- efficacy and their academic achievement and also a no significant difference in relationship between students' self- efficacy and their academic achievement in biology.

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The relationship between students' self-efficacy and their academic achievement in biology as moderated by gender.

The study revealed a positive and very low relationship between secondary school students study habit and their academic achievement in biology when moderated by gender in Owerri education zone in Imo state Nigeria. Hence there is a significant relationship between secondary school students study habit and their academic achievement in biology when moderated by gender. The finding is in line with Zimmerman et al. (1992) who reported a significant relationship between male and female students' self-efficacy and their academic achievement in science subjects. Also, the finding is in line with Odiri (2010) who revealed that there is significant relationship between self-efficacy and gender but it is not in consonance with Tenaw (2013) observed that there is no significant relationship in students' self- efficacy and gender, indicating that gender was not a contributing factor/ determinant in academic achievement of student. By the virtue of this finding, this research has joined the school of thought that relates a positive and very low relationship between students' self - efficacy and their academic achievement in biology when moderated with gender and also a significant difference in relationship between students' self-efficacy and their academic achievement in biology when moderated with gender.

Conclusion

The study examined self-efficacy and academic achievement of biology students in Owerri education zone of Imo state. From the research findings, there is a positive and very low relationship between secondary school students' self-efficacy and their academic achievement in biology. Hence there is no significant relationship between students' self-efficacy and their academic achievements in biology. Also, there is a positive and very low relationship between secondary school students' self-efficacy and their academic achievement in biology when moderated by gender. Hence there is a significant relationship between students' self-efficacy and their academic achievement in biology when moderated with gender.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Students should be allowed to take part in decision making so as to harness their self-efficacy which will in turn boost their academic achievement.
2. School administrators should encourage gender equality among students to avoid lack of confidence, interest and effort.
3. Parents should encourage their wards (especially males) on the need to have positive belief that they can perform better in Biology. This can be done by living by example, and allow them participate in decision making at home.
4. More feasible in-service trainings to be organized by Educational zonal boards and schools to empower teachers. Since, they cannot

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offer what they do not have. Students will in turn benefit from the teachers.

5. There should be a synergy between Parents, teachers, School Administrators and of course students. This will ensure feedback and remedial services so as to complement students' self-efficacy with effort to achieve higher.

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