

The Relationship between Secondary School Students Interest and their Goal Setting Self-Regulated Learning in Biology

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Abstract

This study investigated the relationship between secondary school students interest and their goal setting self-regulated learning in Biology. Correlation research design was used because the study investigated the relationship between two variables without the researchers controlling or manipulating any of them. The target populations for the study were secondary school Biology students in Onitsha education zone in Anambra state, Nigeria. The sample for the study was three hundred and thirty two (332) Biology students (male: 156 and female: 176) drawn through stratified and simple random sampling techniques. Two research questions and one hypothesis was raised to guide the study. The instruments used to elicit the relevant data were: A twenty item instrument questionnaire called Biology Self-Regulated Interest Scale (BSRIS) and Goal Setting Self-Regulated Learning Scale (GSSRLS) which were adapted by the researchers from goal setting motivation, self-directedness interest 1990 and Development and validation of an academic self-regulation of an academic scale for university students 2013. The reliability coefficient of the two adapted instruments were .845 and .88 respectively using Cronbach's Alpha. The data collected were analysed using Pearson's Product Moment Correlation for research questions and the sole hypothesis at .05 level of significance. The results revealed that there exists a direct positive relationship between secondary school students interest and their goal setting self-regulated learning in Biology but the relationship was moderate and there exist a low positive relationship between male secondary school students' interest and self-regulatory learning in Biology and a moderate positive relationship between female secondary school students' interest and self-regulated learning in Biology. Based on the findings of the study, it was concluded that secondary school students interest moderately correlate with their self-regulated learning the subject. Secondly there is significant relationship between secondary school students interest and their goal setting self-regulated learning in Biology. From the conclusions, recommendations were made.

Keywords: Science, Biology, Interest and Goal Setting Self-Regulated Learning.

Introduction

Science is seen as a body of knowledge, a way of investigation and thinking in pursuit of an understanding of nature. Ihekwoaba et. al. (2020) opined that science education plays a vital role in the lives of individuals and the development of a nation. Kingdom-Aaron et. al. (2019) averred that a well developed and implemented science and technology education programme of a country will not only produce knowledgeable and skilled manpower for the workforce but also usher in sustainable socio-economic growth and political stability in that country. Science education to which physics, chemistry and biology from the bases focus not only on producing excellent scientists but also, to produce citizens who use their knowledge to advance the society (Khalifa, 2016). As a result, students are being encouraged to take up science-related courses within the content of science education, Biology has been identified as a very important subject and as a core subject taught at the senior secondary school in Nigeria.

Biology is a branch of natural science that deals with the study of living organisms, structures, functions, evolutions, distribution and interrelationships. Arsal (2019) viewed Biology as the science of life or the study of living things. Obikezie et.al. (2022) averred that Biology covers all the life processes such as movement, respiration, nutrition, irritability, growth, excretion, ecological system and reproduction which make it more important and useful to man. Opara (2019) opined that importance of Biology includes helping man in scientific research, development of new tools, exploring of new environment and environmental identification such as ecology and techniques needed to improve the quality of lives. However, in spite of all these importance of Biology to man, many secondary school Biology students still experience weaknesses in Senior School Certificate Examination (SSCE).

West African Examination Council (WAEC) Chief Examiners' reports 2019, 2020 and 2021 outlined a number of reasons for the weaknesses of students which tantamount to level of achievement in Biology. Among the reasons given were: (i) inability to explain why a Rhesus negative man should not marry a Rhesus positive to avoid losing her second pregnancy (ii) poor grasp of genetics (iii) not given title to diagrams (iii) poor diagrams (iv) inability to cross breeding in the genetics properly (v) poor performance in questions that require application knowledge (vi) inability to identify parts of skeleton. All these have given many educators/stakeholders some concern and research has attempted to delve into causal factors.

Atmotoya (2014) averred there are factors suspected to be responsible for low level and weaknesses among secondary school students' academic achievement in Biology. Some of these factors include lack of teaching material, interest, motivational orientation, attitude, self-esteem/self-efficacy, emotional problems, study habits, teacher consultation and poor interpersonal relationships among students' teachers' poor pedagogical and content knowledge of the subject matter, parental background, extrinsic motivation, anxiety, poor interest, attitude, low self-concept and inability to regulate self-learning. Due to the present study interest and self-regulated learning will be considered.

Interest a mental and neural state of readiness organised through experiences, existing directive or dynamic influence upon the individual response to all objects and situations with which it is related. It consists of three components: cognitive, affective and connotative (Okoye, 2023). The cognitive components in learner's behaviour refer to how information about a particular subject such as Biology is perceived by the learner. At this stage, interest is expressed as beliefs, opinions and perception of the subject. The affective component refers to evaluation, feelings and emotions. Thus, learners express their likes and dislikes to prove their interest in Biology subject (Okoye, 2023). Here, connotative suggests that learner's behaviour, intention or preference is one important aspect of Biology interest and aggregately measured in liking or disliking.

In the other hand, self-regulated learning places more responsibility on the learner to participate actively in classroom environment where student-student and student-teacher interact. There are four basic self-regulation strategies that all students need to be able to use: goal-setting, self-monitoring, effective use of self-instructions or self-talk, and self-reinforcement (Bandura, 2010). The most effective one among the four is goal setting self-regulated learning (GSSRL) because it helps students achieve excellence through practice (Bandura, 2010). Similarly, it takes planning, effort, and persistence over time. Goal setting self-regulated learning allows students to become autonomous learners who can pursue their own interests. Alben (2016) submitted that in GSSRL students are prepared each day to discuss and write down their thoughts on subjects outside their class and actively participating in learning among themselves. Active learning unlike passive learning is

dynamic and has won unanimous support for its use in teaching learning of science subjects especially in Biology (Chorng et. al., 2019). Alben (2016) observed that there is a relationship between goal setting self-regulated learning (GSSRL) and students' interest in science subjects. Alben maintained that active learning is an important aspect of GSSRL. Opara (2018) opined that there is a positive relationship between goal setting self-regulated learning and students interest in Chemistry in Owerri municipal city Nigeria, which leads to students understanding of the subject in taking control of learning process.

Banu (2013) asserted that is a moderate correlation between goal setting self-regulated learning (GSSRL) and high school students in Biology interest in Turkish EFL. Long (2013) observed a moderate correlate between goal self-regulated learning and students' academic interest in Mathematics in Australian program in Malaysia. Ogbenevwede (2019) averred that there is a moderate correlate between goal setting self-regulated learning and students' academic interest in Biology in Delta Central Senatorial District. Ogbenevwede (2019) further averred that is a significant difference between male and female student in the relationship of goal setting self-regulated learning and academic interest of secondary school students' biological concept of unit of life in Delta Central Senatorial District in favour of female students.

Nanda et. al. (2020) observed that there is a positive correlate between goal setting self-regulated learning and learning motivation with metacognitive interest in Biology subject in Thailand. The authors further observed that is a significant difference in male and female high school students' goal setting self-regulated learning and learning motivation with metacognitive skill in Biology subject in Thailand in favour of female high school students. Meanwhile, Nwafor et. al. (2015) did not find a significant relationship between junior secondary school students' goal setting self-regulated learning and students' interest in Basic science. Furthermore, in a study designed to uncover psychological differences between academically weak and gifted students using the Tennessee self-concept scale (TSCS) and Tennessee cognitive development scale (TCDS), Garrido Vergas (2012) did not find the two 33-member groups to differ in mean goal setting self-regulated learning and mean interest.

A large body of literature has also reported a relationship between gender, goal setting self-regulated learning and students' interest reported that boys seem to have a more positive relationship in goal setting self-regulated learning and interest in a number of dimensions such as Biology than girls (Kadivar et. al., 2012; Matura, 2009; Nasir & Akhtar, 2013)

From the foregoing, it appears the question of whether relationship exists or does not exist between the relationship of secondary school students interest and their goal setting self-regulated learning in Biology has not been concisely answered because both the theoretical and empirical studies reviewed in this study have produced diverse and contradictory results. Similarly, the issue of gender difference in interest and goal setting self-regulatory learning (GSSRL) in Biology especially in Onitsha metropolis of Anambra state has not been resolved and therefore subject to further investigation. Thus this study focused on the relationship between secondary school students interest and their goal setting self-regulated learning in Biology.

Purpose of the Study

This study investigated on the relationship between secondary school students interest and their goal setting self-regulated learning in Biology.

1. The relationship between secondary school students interest and their goal setting self-regulated learning in Biology.
2. The relationship between secondary school students interest and their goal setting self-regulated learning in Biology as moderated by gender.

Research Questions

The following three research questions guided this study:

1. What is the relationship between secondary school students interest and their goal setting self-regulated learning in Biology?
2. What is the relationship between secondary school students interest and their goal setting self-regulated learning in Biology as moderated by gender?

Hypothesis

The sole null hypothesis was tested in this study at 0.05 alpha level of significance.

There is no significant relationship between secondary school students interest and their goal setting self-regulated learning in Biology.

Methodology

The study employed a correlation research design. Correlation design is used to investigate relationship between two or more variable without the researcher controlling or manipulating any of them. The area of the study was Onitsha education zone. The population of the study comprised of all the 4000 Senior Secondary two (SSII) Biology students in the 28 State owned co-educational secondary schools in the zone (2640 females and 1360 males). Simple random sampling was used to draw 4000 students (2640 female and 1360 male) from the total population. Each stratum comprised Ogbaru (408 males and 822 females) Onitsha North (1640 males and 1018 females) Onitsha South (800 females and 312 male). Using standard table of Yamame, sample size of 0.5% of population of 4000 is 333. One questionnaire was discarded for improper completion. Thus, sample size for which investigation was complete was 332 (156 males and 176 females).

Instrument

Two instruments were used for the study; Goal Setting Self- Regulated Learning (GSSRL) and Biology self-regulated interest scale (BSRIS). Goal Setting Self-Regulated Learning Scale (GSSRL) was adapted from “Development and validation of an academic self-regulation of an academic scale for university students’ by Nasir (2013) and their colleague researchers from school of education, university of Michigan and the National Center for research to improve post-secondary teaching and learning (NCRIPTAL) named academic self – regulated scale. The instrument is designed with 10 items regarding students’ use of different cognitive and meta cognitive strategies and 10 items concerning student management of different resource. Scale questions, where the scores range from 1 (“strongly disagree”) to 4 (“strongly agree”) was used. The researcher came up with twenty items (20) from Nasir’s instrument named GSRL. GSRL is a 4-point scale of strongly agreed, agreed, disagreed, and strongly disagreed. To ensure the reliability of 20 items GSRL, the instrument was pilot tested using 25 students in Awka education zone which is outside the area of study, a coefficient of .85 was obtained using cronbach alpha indicating that the instrument is reliable.

The second instrument named Biology self-regulated interest scale (BSRIS) is also a 4-point scale of strongly agreed, agreed, disagreed, and strongly disagreed adapted from goal setting motivation, self –directedness interest 1990. The 20-item questions adapted in line with the expects advice. To ensure the reliability of 20 items BSRIS, the instrument was pilot tested using 25 students in Awka metropolis which is outside the area of study, a coefficient of .80 was obtained using cronbach alpha indicating that the instrument is reliable. Both GSRL and BSRIS where validated by three expects, two from Department of Science Education Biology option Nnamdi Azikiwe University Awka and from Department of Education Foundations Nnamdi Azikiwe University Awka. Pearson product moment correlation was used to answer research questions and test the sole hypothesis at .05 level of significant.

Ranges of scores

$\pm 0.80 - \pm 1.00$

$\pm 0.31 - \pm 0.79$

$\pm 0.00 - \pm 0.30$

Decision

High positive or negative relationships

Moderate positive or negative relationship

Low positive or negative relationship.

Interpreting the null hypotheses, the decision rule is that when P-value is less than or equal to 0.05 ($P \leq 0.05$) the null hypotheses was rejected. On the other hand, when P-value is greater than the alpha level 0.05 ($P \geq 0.05$), the null hypotheses was not rejected (accepted).

Result

The result of this study was presented in line with the research questions and the hypothesis as follows.

Research Question1

What is the relationship between secondary school students interest and their goal setting self-regulated learning in Biology?

Table 1: Pearson's Product Moment Correlation Analysis of the relationship between Secondary School Students' Interest and their Goal Setting Self-Regulated Learning in Biology.

Variable	N	r	R ²	Magnitude & Direction	Sig	Decision
GSSRLS	332	0.39	0.15	moderate positive	.000	S
Academic interest						

R² =coefficient of determination

To answer research question 1, response secondary school students interest and their goal setting self-regulated learning in Biology and the correlation coefficient obtained was 0.39 as shown on Table 1. This means that, there exists a direct positive relationship between secondary school students interest and their goal setting self-regulated learning in Biology but the relationship was

moderate. The coefficient of determination associated with the correlation coefficient of 0.39 was 0.15. This coefficient of determination indicates that, 15% of secondary school students' interest accounted for the variation in their goal setting self-regulated learning in Biology. This implies that 85% of variation in their goal setting self-regulated learning is attributed to other factors.

Research Question 2

What is the relationship between secondary school students interest and their goal setting self-regulated learning in Biology as moderated by gender?

Table 2: Pearson's Product Moment Correlation Analysis of the relationship between secondary school students interest and their goal setting self-regulated learning in Biology as moderated by gender

Variable	N	r	R ²	Magnitude & Direction	
Male Students' interest	156	0.09	0.01	Low positive	-
Female Students' interest	176	0.80	0.63		

R² = coefficient of determination

In order to provide answer to research question 2, male secondary students' interest scores were correlated with their self-regulatory learning and the correlation coefficient obtained was 0.09 as shown on Table 2. This means that, there exists a low positive relationship between male secondary school students' interest and self-regulatory learning in Biology. The coefficient of determination associated with the correlation coefficient of 0.09 was 0.01. This coefficient of determination indicates that, 1% of male students accounted for the variation in their interest in Biology. This implies that 99% of variation in male's interest in Biology is attributed to other factors other than that gender. Table 2 also shows that, female students' responses and their interest scores were correlated and the correlation coefficient obtained was 0.80 as shown on Table 2. This means that, there exist a direct positive relationship between female secondary school students interest and their self-regulatory learning in Biology. The coefficient of determination associated with the correlation coefficient of 0.80 was 0.63. This coefficient of determination indicates that, 63% of female students accounted for the variation in their academic interest in Biology. This implies that 37% of variation in their academic interest is attributed to other factors other than the female students. The difference in the relationship between students and their academic interest was 0.71 in favour of female students.

Hypothesis

The sole null hypothesis was tested in this study at .05 alpha level of significance.

There is no significant relationship between secondary school students interest and their goal setting self-regulated learning in Biology.

Table 1 revealed the Pearson correlation coefficient for the relationship between secondary school students' interest and their goal setting self-regulated learning in Biology. A moderate positive correlation was found $r(332) = 0.32$, $p = 0.00 < 0.05$ indicating a significant relationship between the two variables. The null hypothesis which stated that there is no significant relationship between secondary school students interest and their goal setting self-regulated learning in Biology was

therefore rejected. The inference drawn was that the higher students' self regulates their learning, the more positive interest they develop in learning Biology.

Discussion

The results of the study were discussed under the following sub-headings:

The relationship between secondary school students interest and their goal setting self-regulated learning in Biology.

The relationship between secondary school students interest and their goal setting self-regulated learning in Biology as moderated by gender.

The relationship between secondary school students interest and their goal setting self-regulated learning in Biology.

Result in Table 1 is correlation coefficients between secondary school students interest and their goal setting self-regulated learning in Biology. Results showed that the correlation between secondary school students' interest and their self-regulated learning shown a moderate positive relationship. This finding portrays that secondary school students interest does plays an important role in either to predict or to affect the way students regulate their learning in Biology subject. The finding of this study supported that of other previous researcher such as Banu (2013) who asserted that is a moderate correlation between goal setting self-regulated learning and high school students interest in Biology in Turkish EFL. Also the finding is in line with Long (2013) who observed a slight positive correlate between goal self-regulated learning and students' interest in Mathematics in Australian program in Malaysia and Ogbenewede (2019) who averred that there is a moderate correlate between goal setting self-regulated learning and students' interest in Biology in Delta Central Senatorial District. The study is also in consonance with Garrido Vergas (2012) who did not find the two 33-member groups to differ in mean goal setting self-regulated learning and mean interest in a study designed to uncover psychological differences between academically weak and gifted students using the Tennessee self-concept scale (TSCS) and Tennessee cognitive development scale (TCDS). By virtue of this finding, this research has joined the school of thought that relates secondary school students' interest significantly to their self-regulated learning in Biology.

The relationship between secondary school students interest and their goal setting self-regulated learning in Biology as moderated by gender.

In order to provide answer to research question 2, male students' scores on interest in Biology were correlated with those female students' scores on interest in Biology and the correlation coefficient were obtained as shown on Table 2. This means that, there exist a weak positive relationship between male students' scores and female students' scores in Biology interest in favour of female students. The inference drawn was that, there was a significant relationship in the difference between male Biology students' interest and that of their female counterpart in favour of female students. Hence female students have high interest than the male students in Biology when correlated with their self-regulated learning. This result is not in line with researchers' like Kadivar et. al. (2012), Matura (2009), Nasir and Akhtar (2013) who observed that that boys seem to have a more positive relationship in goal setting self-regulated learning and interest in a number of dimensions such as Biology than girls but the finding is in line with Nanda et. al. (2020) and Ogbenewede (2019) who claimed that the female students had a better interest in Biology than the male students. There is a statistically significant difference between male and female students in their interest in Biology but the finding of the study is not in line with the findings of Nwafor et. al. (2015) who observed no

significant relationship between junior secondary school students' goal setting self-regulated learning and students' interest in Basic science. By virtue of this finding, this research has joined the school of thought that relates the relationship between secondary school students interest and their goal setting self-regulated learning in Biology as moderated by gender.

Conclusions

Based on the investigation into the relationship between secondary school students interest and their goal setting self-regulated learning in Biology, it can be concluded that secondary school students interest moderately correlate with their self-regulated learning the subject. Secondly there is significant relationship between secondary school students interest and their goal setting self-regulated learning in Biology.

Recommendations

1. Parents should develop high self-regulated learning strategy in their children at the early stages of their lives. This could be best done at home which is the most important social force in shaping and maintaining the child's self-learning. The home environment is the strongest agent in shaping the child's self-learning, so the earlier he is exposed to positive self-regulated learning formation the better.
2. Curriculum developers should design programmes and courses that will motivate students to think critically and to enhance their interest towards Biology.
3. Self-regulated learning strategy training workshops and seminars should be organized for Biology teachers by government to properly inculcate into them the right interest to be exhibited in Biology lessons, this will enable to increase students in the subject.

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