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STUDENTS' COMMITMENT AND INTERNAL-EXTERNAL CONTROL BELIEFS AS DETERMINANTS OF BIOLOGY ACHIEVEMENT IN ANAMBRA STATE

Chinyere Obianuju Nwosu and Emeka Udochukwu Okafor

Department of Science Education,
Faculty of Education,
Nnamdi Azikiwe University,
Awka, Anambra State, Nigeria.
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Abstract: The study investigated students' commitment and locus of control as predictors of achievement in biology in secondary schools in Awka education zone. Three research questions guided the study and three hypotheses were tested. Predictive correlation design was adopted for the study. The population of the study was 4, 632 senior secondary year two (SS2) students offering Biology in Awka education zone out of which 600 students were involved in the study. The instruments for data collection were Students' Academic Commitment Questionnaire (SACQ) and Locus of Control Questionnaire (LOCQ) validated by three experts and the reliability of the instruments were established using Cronbach Alpha which yielded coefficient values of 0.77 for SACQ and 0.80 for LOCQ. The data obtained were analyzed using simple and multiple linear regressions. The findings of the study showed that a low positive significant relationship exists between students' commitment and their achievement in biology with commitment predicting 2.7% of the variance in biology scores. A low positive significant relationship exists between students' locus of control and their achievement in biology with locus of control predicting 0.8% of the variance in biology scores. Commitment and locus of control individually and jointly are significant predictor secondary school students' achievement scores in Biology. The study recommended that biology teachers should ensure that students are highly commitment in the learning process and to the learning material by giving them engaging assignments and exercises as well as projects that requires high level commitment to achieve.

Keywords: commitment, locus of control, achievement, biology, regression

Introduction

Science and technology are key factors that bring about rapid development of any society and attainment of its economic potentials. Many advanced nations of the world owe their advancement and development to the great contributions of science and technology. Hence, every nation of the world is making effort to advance its science

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education at all levels of learning. Biology is one of the science subjects that form the bedrock of knowledge upon which future doctors, pharmacists, nurses, laboratory scientists, agriculturists, geneticists/molecular biologists, environmentalists and indeed several other professional endeavors stand upon for further advancements.

Biology education according to Ufomadu and Okoli (2019) enables students to make more informed decision about their own health and about significant biological issues such as genetically modified crops and the use and abuse of drugs. With the current ecological trends in the globe today, studying biology equips students with a better awareness of ecological issues, and enables them to be useful and actively involved in environmental protection efforts (Asuzu and Okoli, 2019). The advent of Covid-19 pandemic shows more clearly, the importance of biology; given that the COVID-19 disease is caused by a virus, an organism of significant biological importance.

Despite the enormous importance of the subject, data from the Chief Examiner's Reports across several years show that students' achievement in Biology has not improved as expected given the subject popularity among science and art students. Students' achievement in the West African Senior School Certificate Examination (WASSCE) has been greeted by appalling remarks. The West African Examination Council's (WAEC) Chief Examiners' Report over the years show that students' academic achievement have not improved. The Nigerian Chief Examiner's Report for Nigeria revealed that that from 2008 to 2012, students' academic achievement in both biology practical and essay examinations, was no up to a raw score mean 25.00. From 2007 to 2017, the raw mean score of students in both examination were below 32.00. In 2018, students' achievement decreased from 31.00 in essay examination to 30.00 recorded in 2017. Although, the raw mean score in practical biology in 2018 was 27.00 which higher than 24.00 in 2017, it was still below the stanine passmark of 40.00. Many researches have been undertaken to identify the various causes for such abysmal performances in biology in our secondary schools. Researchers such as Ezenwabachili and Okoli (2021), Okafor and Okoli (2020), Ogbuze and Okoli (2020), Ufommadu and Okoli (2019) noted factors such as teaching methods adopted by biology teachers, lack of laboratory facilities, absence of practical and instructional materials as the contributors to poor achievement. Thus, the focus of research has been on these identified areas, without any significant increase in achievement in biology. This is because, most of the innovative teaching methods experimented in most studies can hardly be implemented in the Nigerian biology classroom due lack of power, infrastructure and technological advancement. Again, available laboratory facilities, Ogbuze and Okoli (2020) noted, are not enough for the teeming number of biology students often enrolled for the examination. The need arises therefore, that there be a change in the direction of research studies aimed at improving students' achievement in biology, to psychological, social and psychosocial factors such as commitment and locus of control among others.

Commitment refers to affective factors involving interest, faith and acceptance of positive attitudes toward certain things (Shannon, 2018). Students' commitment according to Hanke (2016) refers to overall impression, satisfaction, sense of belonging, perception of quality and attraction to a particular academic pursuit. Godwin, Uduak and Aniefiok (2012) described students' commitment to the school as regular attendance, engaging in extracurricular social activities, participating in classroom and school-wide decisions, expressing their own ideas, and the level of interpreting the relationship of students with their friends and teachers. Commitment is a serious factor relating to student persistence in education. Higher commitment to learning fosters higher performance as students achieve

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good marks. Putri (2014) further asserted that educational and instructional objectives will only be realized if the students show commitment to academic tasks and activities.

Students' commitment enables them to develop interpersonal and intrapersonal skills needed to thrive in the social and academic atmosphere of the school. When students are committed, they do their best and that everything needed to be done to improve achievement is done (Furahini and Baraka, 2020). However, when students are not committed, they absent themselves from school, neglect teacher's assignments and may even end up as school drop outs. Students who lack commitment refuse to accept their personal responsibility to learning which is determined by action and hard-work. In recent times however, it is the researcher's observation that students at the secondary level in Awka Education Zone show little or no commitment to learning. The dawn of the popular notion 'school na scam' has led a lot of students to devote little commitment to school but with much commitment to making money. There is need to establish therefore, whether students' commitment significantly predict achievement in biology or not. The necessity of the study on commitment is predicated on the fact that lack of commitment could reduce academic attention and interest in learning. Commitment to academic activities may sometimes be influenced by the students' locus of control.

Locus of control is a person's belief about how much control he or she has over events in his or her life (Abel and Moyosola, 2013). It refers to a person's perception about the underlying root causes of successes or failures in his or her life. According to Olufemi (2014), when a student most often believe that their academic successes and failures are due to factors within their control, they are viewed as having an internal locus of control (i.e., success or failure happened because of effort they put forward or did not put forward). If a student believe that their successes and failures are due to something outside of their control (i.e., success or failure happened because of luck or task difficulty), they are regarded as having an external locus of control. Perceptions about locus of control can lead to both positive and negative reactions by students. For example, if a student interprets a failure as the result of too little effort (an internal locus of control), the student will likely believe that increased effort through commitment will make a positive change in the outcome.

Locus of control forms during childhood and stabilizes during adolescence; and it depends on various experiences the individual goes through (Syeda and Ruhi, 2014). Although studies on relationship between locus of control and achievement abounds, studies on the prediction of achievement in biology moderated by commitment is not replete in literature to the best knowledge of the researcher. There arises the need to further investigate, not just the prediction of achievement of secondary school students in biology by locus of control, but also, the interaction through which commitment and locus of control predict achievement in biology. **Purpose of the Study**

The purpose of this study is to determine to students' commitment and locus of control as predictors of their achievement in biology in secondary schools in Awka Education Zone of Anambra state. The study seeks to determine the:

1. Prediction of secondary school students' achievement scores in biology by students' commitment.
2. Prediction of secondary school students' achievement scores in biology by students' locus of control.
3. Joint prediction of secondary school students' achievement scores in biology by students' commitment and locus of control. **Research Questions**

1. To what extent does commitment predict secondary school students' achievement scores in biology?

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2. To what extent does locus of control predict secondary school students' achievement scores in biology?
3. To what extent do commitment and locus of control jointly predict secondary school students' achievement scores in biology?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance.

1. Commitment does not significantly predict secondary school students' achievement scores in biology.
2. Locus of control does not significantly predict secondary school students' achievement scores in biology.
3. Commitment and locus of control do not significantly co-predict secondary school students' achievement scores in biology.

Method

The design that adopted for the study was correlational design. The design according to Nworgu (2015) seeks to establish what relationship exists between two or more variables that the research is interested in. The study was carried out in Awka Education Zone in Anambra State. The population of the study was 4,632 senior secondary school year two (SS2) students offering biology in Awka Education Zone.

The sample size for the study was 600 students. The sample was obtained using a multistage sampling procedure. In the first stage, purposive sampling was used to select 12 schools, two boys only and two girls only schools and eight coeducation schools 9 co-educational schools in the Zone. The rationale was to ensure greater coverage of secondary schools in Awka Education Zone. In the second stage, purposive sampling was used to select 50 students from each of the 12 schools. The choice of those fifty students was based on the availability of their complete records of biology scores for two most recent terms.

The instruments for data collection are Students' Academic Commitment Questionnaire (SACQ) and Locus of Control Questionnaire (LOCQ). Students' Academic Commitment Questionnaire (SACQ) was adopted from Viljoen (2015) Academic Commitment Scale (ACS). SACQ is a 30 item questionnaire designed on a four-point scale. The original instrument has a six-point likert type scale with 35 items. It required the respondents to evaluate themselves against the statement using values of agreement namely: strongly disagree, disagree, slightly disagree, slightly agree, agree, strongly agree. Each scale identifies five factors namely of level of commitment, satisfaction, level of investment, the quality of alternatives, and meaningfulness in relation to the students' academics. Locus of Control Questionnaire (LOCQ) was adopted from Trice (1985). LOCQ is a 28 item questionnaire designed on a four point scale ranging from Strongly Agree (SA), through Agree (A), Disagree (D) to Strongly Disagree (SD). The instrument require students to tick response option that most expresses their agreement or disagreement with the items.

The students' academic achievement was obtained from the study biology teachers' diary for two most current terms. The average of the scores from the terms was computed to obtain the students' biology achievement. The instruments, objectives of the study, research questions and hypotheses were given to two lecturers from the Department of Science Education and the Department of Educational Foundations Nnamdi Azikiwe University, Awka and one experience biology secondary school teacher for validation. Their corrections were effected in the final copy of the instruments. The reliability of instruments was established using Cronbach's Alpha. The instruments were administered once to 20 students of biology in Ogbaru Local government area in Onitsha

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Education Zone. The scores generated were subjected to Cronbach's Alpha computation. The coefficient of internal consistency obtained for SACQ is 0.77 and 0.80 for LOCQ.

The data relating to students' achievement in biology was collected by the researcher with the assistance of four research assistants. The research assistants were briefed on the purpose of the study and how to collect data for the study. They worked closely with the secondary school biology teachers of each school visited to administer the questionnaires and collect them back. The researcher scored the instruments and collated the data including the students' results in Biology for analysis. The data collected with the instruments was analyzed using the Pearson's Product Moment correlation coefficient (r) and coefficient of determination (r^2) for answering the research question. The interpretation of the correlation coefficient was according Nworgu (2015) who provided a three-way guide for interpreting correlation coefficient values when a large number of pairs of scores have been correlated. They are as follows: $r = \pm .30$ and below, low relationship; $r = \pm .30$ to below ± 0.80 , moderate relationship and $r = \mp .80$ and above, high relationship. The hypotheses were analyzed using simple and multiple linear regressions. The decision rule for accepting or rejecting the null hypotheses was to reject the null hypotheses whenever Pvalue is less than or equals 0.05

($P \leq 0.05$) and to accept the null hypotheses whenever Pvalue is greater than 0.05 ($P > 0.05$).

Results

Research Question 1: To what extent does commitment predict secondary school students' achievement scores in biology?

Table 1: Extent of Prediction of Students' Achievement in Biology by Commitment

Model R	R ²	Adjusted R ²	Std. Error	Decision
1 .165 ^a	.027	.026	15.322	Low positive relationship a. Predictors: (Constant), Commitment

Table 1 shows a low positive relationship ($R = 0.165$) exists between students' commitment and their achievement in biology. The R-Square value of 0.027 indicates that 2.7% of the variance in biology scores is predicted by commitment.

Research Question 2: To what extent does locus of control predict secondary school students' achievement scores in biology?

Table 2: Extent of Prediction of Students' Achievement in Biology by Locus of Control

Model R	R ²	Adjusted R ²	Std. Error	Decision
1 .088 ^a	.008	.006	15.476	Low positive relationship a. Predictors: (Constant), Locus of control

Table 2 shows a low positive relationship ($R = 0.088$) exists between students' locus of control and their achievement in biology. The R-Square value of 0.008 indicates that 0.8% of the variance in biology scores is predicted by locus of control.

Research Question 3: To what extent do commitment and locus of control jointly predict secondary school students' achievement scores in biology?

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Table 3: Joint Prediction of Students' Achievement in Biology by Commitment and Locus of Control

Model	R	R ²	Adjusted R ²	Std. Error	Decision
1	.189 ^a	.036	.032	15.270	Low positive relationship

a. Predictors: (Constant), Commitment, Locus of control

Table 3 shows a low positive relationship ($R = 0.189$) exists among students' commitment, locus of control and their achievement in biology. The R-Square value of 0.036 indicates that 3.6% of the variance in biology scores is jointly predicted by commitment and locus of control.

Hypothesis 1: Commitment is not a significantly predict secondary school students' achievement scores in biology.

Table 4: ANOVA on Significance of Prediction of Achievement in Biology by Students' Commitment

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	13950.309	1 598	3950.309	16.827	.000 ^b
Residual	140386.751		234.760		
Total	144337.060	599			

a. Dependent Variable: Achievement

b. Predictors: (Constant), Commitment

Table 4 shows that commitment is a significant predictor of achievement scores in biology $F(1, 598) = 11827$, $P(0.000) < 0.05$. The null hypothesis was rejected. Therefore, Commitment significantly predicts secondary school students' achievement scores in biology.

Hypothesis 2: Locus of control is not a significantly predict secondary school students' achievement scores in biology.

Table 5: ANOVA on Significance of Prediction of Achievement in Biology by Students' Locus of Control

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	11117.377	1 598	1117.377	4.665	.031 ^b
Residual	143219.683		239.498		
Total	144337.060	599			

a. Dependent Variable: Achievement

b. Predictors: (Constant), Locus of Control

Table 5 shows that locus of control is a significant predictor of achievement scores in biology $F(1, 598) = 4.665$, $P(0.031) < 0.05$. The null hypothesis was rejected. Therefore, locus of control is a significant predictor of secondary school students' achievement scores in Biology. **Hypothesis 1:** Commitment and locus of control do not significantly co-predict secondary school students' achievement scores in biology.

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Table 6: ANOVA on Significance of Joint Prediction of Achievement in Biology by Students' Commitment and Locus of Control

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	15133.008	2 597	2566.504	11.007	.000 ^b
Residual	139204.052		233.173		
Total	144337.060	599			

a. Dependent Variable: Achievement

b. Predictors: (Constant), Commitment, Locus of Control

Table 6 shows that achievement in biology is significantly co-predicted by commitment and locus of control $F(1, 597) = 11.007$, $P(0.000) < 0.05$. The null hypothesis was rejected. Therefore, achievement in biology is significantly co-predicted by commitment and locus of control.

Since all students' commitment and locus of control joint significant predictors of achievement scores in biology, the regression equation (model) for the prediction of achievement score in biology by both variables can be derived from Table 7.

Table 7: Contributions of Commitment and Locus of Control in the Prediction of Achievement Scores in Biology

Unstandardize	d Coefficients Standardized Coefficients			
Model	Std. Error	Beta	t	Sig.
B				
(Constant)	184.520 .201 6.918 .048		12.218 .000	
Commitment		.167	4.150 .000	
Locus of Control	.128 .057	.091	2.252 .025	

a. Dependent Variable: Achievement

From Table 7 it can be seen that the constant = 84.520 and beta for values for commitment and locus of control = 0.201 and 0.128 respectively. Hence, the regression model ($Y = a + bX_1 + cX_2$) can be presented thus:

$$BA = 84.520 + 0.201CO + 0.128LC$$

Where, BA = Biology Achievement, CO = Commitment and LC= Locus of Control.

Discussion

The findings of the study showed that commitment significantly predicted students' achievement in biology. The findings of the study can be attributed to the fact that students who have a good academic commitment indicate certain high level of attentiveness to classroom activities and engagement in peer conversations about appropriate academic material. Disruptive and inattentive-withdrawn behaviour are indicated on lack of commitment to learning. Thus, students who are inattentive, withdrawn, and disengaged in the classroom have poorer academic performance when compared to engaged and committed students. students who displayed commitment in the form of coming to class on time, being prepared for and participating in class work, and making the effort to complete assignments and homework will be more likely successful academically, having good grades at all times.

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The finding of the study can also be explained in the light of committed students worker harder despite perceived difficult in learning biology and other academic challenges. The committed students are ready to do anything so as to make learning occurs. They therefore develop academic skills that foster deeper learning and proper conceptualization of concepts in biology. When students are committed, they make sure that they complete assignment and study with little or no supervision either from parents or teacher. They have the tendency to ask questions for clarification so that they can be certain of what knowledge has been mastered or not mastered. Such students also have high self-evaluation skills.

The findings of the study support the findings of Abdul (2009) that there was a significant relationship between teachers' commitment and students' achievement. The finding of the study is also in line with the findings of Godwin, Uduak and Aniefiok (2012) that students who were committed to technology had higher achievement in Introductory Technology than those who were not. The finding of Fitriani (2017) that student commitment to doing lecture task (task commitment) had significant relation with achievement is also in line with the finding of the study. The finding of the study does not contradict the findings of Hope (2019) that there was a positive significant relationship between student commitment and academic achievement.

The finding of the study also showed that locus of control significantly predicted students' achievement. Locus of control refers to an individual's perception about the underlying main causes of events in his/her life. It is a psychological concept that refers to how strongly people believe they have control over the situations and experiences that affect their lives. In education, locus of control typically refers to how students perceive the causes of their academic success or failure in school. Locus of control therefore has positive effect on academic achievement if students are internally motivated towards their studies, they perform well in studies using their skills with changing techniques. Students studying with various techniques perform well and their interest level in learning is sustained by their internal locus of control. Having an internal locus of control is generally a positive thing. Those who report an internal locus of control are more likely to be in better health, show lower levels of psychological stress, and have greater confidence in their ability to attain greater academic achievement.

The finding of the study is in line with the findings of Abel and Moyosola (2013) that locus of control predicted academic achievement. The findings of the study support the findings of Olufemi (2014) a significant relationship exist between locus of control and achievement in biology. The finding of Muhammad and Ghulam (2014) locus of control significantly impacted achievement lends credence to the finding of the study. The finding of the study does not contravene the finding of Ben (2018) that locus of control was a significant predictor of achievement in mathematics.

The findings of the study further showed that commitment and locus of control jointly are significant predictors of achievement in biology. The study findings show that internal locus of control drives academic commitment which in turn improves achievement. Students whose academic locus of control is hinged on external factors may not be committed enough and may end up having poor academic achievement. Students who show high level of commitment however, must have internal locus of control that has bearing with academic pursuit, or, they may not be able to sustain the commitment to learn. The findings of the study is in line with the findings of Muhammad and Ghulam (2014) commitment and locus of control has significant positive impact on students' achievement.

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Conclusion

The study concludes that commitment and locus of control individually are significant predictors of students' achievement in Biology. Again commitment and locus of control jointly are significant predictors of achievement in biology. Thus, students' commitment and locus of control exert significant influence on their achievement in biology. **Recommendations**

The following recommendations are made in the light of the findings of the study:

1. Biology teachers should ensure that students are highly commitment in the learning process and to the learning material by giving them engaging assignments and exercises as well as projects that requires high level commitment to achieve.
2. Effort should be made by biology teachers to monitor students' commitment to learning biology and structure their instructional delivery process to amass sustained commitment to learning from students.
3. School counselors should orient students on the need to focus on their studies and instill in them the knowledge that the harder they study, the better their achievement in biology will become and not otherwise.

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