CLASS WORKLOAD AS PREDICTOR OF SENIOR SECONDARY SCHOOL STUDENTS' ACADEMIC ACHIEVEMENT IN BIOLOGY IN ADAMAWA STATE, NIGERIA

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Abstract

This study examined class workload as a predictor of Senior Secondary School Students' Academic Achievement in Biology in Adamawa State, Nigeria. One research question and one hypothesis guided the study. The hypothesis was tested at 0.05 level of significance respectively. The study adopted the correlational research design. The population comprised of 35,525 Senior Secondary School (SSS) III Biology students. 396 students offering Biology were drawn from this population using Taro Yamane formula for sample size determination. Multistage sampling technique was adopted for the study. A questionnaire and a student's proforma were used as instruments for data collection. The instrument was validated by three experts and Cronbach's alpha statistics was used to obtain a reliability co-efficient of 0.86. The data collected were analyzed using descriptive statistics of mean, standard deviation in answering the research questions, while the hypothesis was tested using simple linear regression. The analysis of research question showed that Senior secondary school students of Biology have high level of class workload with average mean of 3.90. Furthermore, findings from hypothesis showed that class workload positively influence academic achievement of students in Biology (F (1, 394) = 198.33, r = 0. 580, p = 0.000 < 0.05), Based on these findings, it was recommended that students should be taught study skills which will help in reducing academic classwork load.

Keyword: Classwork load, predictor, Academic Achievement.

Introduction

The bedrock and vehicle for human development is education. It is an investment in people which pays immeasurable dividend to the society but when that investment is not made or is inadequately made, the society involved suffers a great deal of loss (Franklin, 2018). Despite investment in science education by Nigerian government, non-governmental organizations and parents to meet up with the present challenge of the 21st century. Students' achievement at the Senior Secondary Certificate Examination (SSCE)

in biology had been very low when compared with the enrolment of students over the years (Femi, 2022; WAEC Chief Examiners Report 2019 and 2015, Gengle, Abel & Mohammed, 2016). Furthermore, Adamawa state is one of the 10 least states in the ranking position of the WAEC result. In 2015, 2017 and 2018, the percentage mean scores of WAEC were 19.66%, 14.25% and 17.26% respectively (Ifop, 2018). Ifop furthered that Adamawa state took the 27th and 28th position in 2017 and 2018 respectively. Similarly, the biology student's NECO performance from 2014 to 2019 in Adamawa State indicates that in 2014, 2015 2016, 2017, 2018 and 2019 the percentages of students that obtained credit pass were 27.16%, 36.06, 37.58%, 31.89%, 29.09% and 32.51% respectively (Adamawa State Ministry of Education Yola 2021). In oder to avert the causes that lead to poor student academic achievement in biology the class workload of students needs to be investigated.

Class workloads is a combination of academic demands placed upon the student during the teaching and learning process. Academic demands on the students are assignments, practicals, teaching notes, duty roster and attending classes. Scully and Kerr (2021) established that workload refers to the number of different yet related activities students engage in for their academic, social, and physical progress in school. However, most of these works are specified at a minimum of 30 minutes and a maximum of an hour per subject. Likewise, Lal (2024) described workload as the perceived relationship between the amount of mental processing and capability or resources and amount required by the task. Nor and Zakaria (2020) outlined student's workload to include class attendance, amount of required reading, group activities and assessment tasks or combination of all these.

According to Rahim, et al (2016) workload should include a combination of three activities that is class attendance (both face to face and online), learning activities including reading or research and undertaking assessment tasks. Workload can be classified into quantitative (the amount of work to be done) and qualitative (the difficulty of the work). The workload could also be too high or too low. If it is too high it could lead to academic stress and if it is too low it could be boredom, loss of situation, awareness and reduced alertness (Almela-Aro, & Upadyaya 2020).

An increase in class workload stresses up students when the academic workload is more than they can handle. This may lead to stress and students may not be focused during teaching and learning (Essel & Owusu, 2017). Scully and Kerr (2021) established that a heavy academic workload can cause feelings of nervousness and anxiousness which cause stress if it persists for a longer period. Heavy academic workload is the most prominent factor affecting the stress level of secondary school students where it dominaties about 90% of the top 10 stressors. It also was found that tests and examinations were the top 10 stressors in academic-related workload (Nor and Zakaria, 2020).

Ganesh, Weerasinghe and Kausar (2016) shows that assignment, tutorial, classes, test or examination, quizzes, report and practical are class workload that led to negative academic performance of students. Kerr and Scully (2014) revealed that students who are overloaded may probably engage in surface learning and have no chance to engage in deep learning that has a long-lasting positive affect. Deep learning and active engagement in learning has a positive effect on student's motivation for studying (Asikainen, 2014). Ojo and Oladipo, (2022) found that class

workload significantly contribute to poor academic achievement of students. According to Niyonzima, (2021).the reasons for failure in biology by students are unavailability of text book, laboratory apparatus and other learning resources, lack of adequate instructional material and science equipment. Other contributors include assignment, tutorial, classes, test or examination, quizzes, report and practical (Aam, at el 2017), Niyonzima, (2021) socio-economic and educational background of parents.

Statement of the Problem

The poor students' academic achievement in the Senior Secondary School Certificate Examination (SSCE) in biology has been of great concern to scholars, stakeholders and the government. Workshops, conferences, and seminars have been organized to look into lasting solutions to poor academic achievement of senior secondary school students in science subjects in general, and biology in particular. The percentage of Nigerian candidates who sat for the National Examination Council in the year 2015, 2016 and 2017 that had credits in biology was 36.06%, 37.58% and 31.89% respectively (Adamawa State Ministry of Education Yola, 2021).

Adamawa state is one of the 10 least states in the ranking position of the WAEC result. In 2015, 2017 and 2018, the percentage mean scores of WAEC were 19.66%, 14.25%, and 17.26% respectively. Adamawa State took the 27th and 28th positions in 2017 and 2018 respectively. Similarly, the biology student's NECO performance from 2014 to 2019 in Adamawa State indicates that in 2014, 2015 2016, 2017, 2018 and 2019 the percentages of students that obtained credit pass were 27.16%, 36.06, 37.58%, 31.89%, 29.09% and 32.51% respectively.

Perhaps some of the most prominent factors affecting students' learning and academic achievements may be due to academic stress which includes: homework and load, attitude towards school, overcrowded curriculum relationships with teachers, peers and parents, expectations of teachers, parents, self, and peer, financial constraints and poor teaching methods. It is based on this tract that inspired the researchers to investigate class workload as a predictor of senior secondary school student's academic achievement in biology in Adamawa State, Nigeria.

Research Question

1. What is the level of class workload of Senior Secondary Schools Students in Biology in Adamawa State?
2.

Hypothesis

The null hypothesis was formulated and tested at 0.05 level of significance.

H_{01}: Class work load does not significantly predict senior secondary school students' academic achievement in Biology in Adamawa state, Nigeria.

Methodology

This study adopted correlational research design. The researcher adopted this design because correlation research is a type of research method that involves observing two variables in order to establish a statistically corresponding relationship between them. According to University of Chicago, (2025) predictive correlational studies predict the variance of one or more variables based on the variance of another variable(s). The authors added that the study variables are classified as independent (predictor) and dependent (outcome). In this study, the outcome students' academic achievement in

Biology, are used with the predictor variable (class workload) to determine both their joint and relative predictive values. Population of the study consisted of 35,525 SS III biology students in senior secondary schools in Adamawa state (Adamawa State Post Primary Schools Management Board, 2021). The reason for choosing SS III biology students is because they are in their final year they must have undergone various stages of learning as such they are the best representative of student facing stress and their level of academic achievement can easily be studied and predicted without much difficulty.

The sample for the study consisted of 396 SS III biology students. The sample were drawn from total population of 35,525 SS III biology students from the three Education zone of Adamawa state Nigeria using the Taro Yamane (1967) formula for calculating simple sampling. Multi-stage sampling procedure was adopted for this study. The instruments used for data collection were pro-forma to collect students NECO results from 2014-2019 and a questionnaire to determine whether class workload would predict Biology students' achievement The instrument consisted of 15 items using a five Likert-like scale, The response modes are: Very Low Stress Level (VLSL-1), Low Stress Level (LSL-2), Moderate Stress Level (MSL-3), High Stress Level (HSL-4), and Very High Stress Level (VHSL-5). The SS III biology students responded to the items and pro-forma was used to collect students NECO result from 2014.

To ensure content and face validity of the instrument, the questionnaire was subjected to validation by three experts from Modibbo Adama University Yola. The validators checked the appropriateness of the items,

language and also ensured that the items reflect the content areas of the study. The experts' corrections and suggestions concerning the content of the items were used to draft the final questionnaire for the study. To establish the internal consistency of the instrument for this study, trial test was conducted, the data collected was analyzed using Cronbach's Alpha method to determine the internal consistency of the items (SpringerLink, 2023). Reliability index of 0.87 was obtained, this means that the instrument was reliable

The research questions were answered using descriptive statistics of mean and standard deviation while, the hypotheses were tested at 0.05 level of significance using linear regression. The decision rule on testing the null hypothesis will be reject if the null hypothesis $p \leq 0.05$ and if $p > 0.05$ do not reject the null hypothesis. The NECO results was coded thus: A1 was accorded 5 points, B2 - B3was accorded 4 points, C4 - C6 was accorded 3 points, E7 - E8 was accorded 2 points while F9 was accorded 1 as suggested by Gengle, Abel & Mohammed (2016) and Simply Psychology,(2023).

Results
Research Question 1: What is the level Class Work Load of Senior Secondary Schools Students in Biology in Adamawa State?
Table 1 below shows the presentation of class workload as predictor using mean and standard deviation.

Table 1: Mean and Standard deviation of Stress due to Class Work Load of Senior Secondary Schools Students in Biology in Adamawa State.

S/N	items	n = 396	Mean	Std. D	Remarks
1.	Handling more than 4 subjects per day.		4.17	0.80	HLS
2.	More than 2 double periods of compulsory subjects per day		3.95	0.87	HLS
3.	Reading many subjects during examination.		4.07	0.82	HLS
4.	Haven too much homework to do per day.		4.10	0.77	HLS
5.	Copying notes		4.00	0.81	HLS
6.	Reading and not understanding.		3.45	1.00	MLS
7.	Subject you don't understand.		3.83	0.84	HLS
8.	Downloading notes from text books and note books before understanding		3.47	1.01	MLS
9.	Studying past questions for all subjects before examination		3.82	0.76	HLS
10.	Study after each subject being taught.		3.13	1.42	MLS
11.	Copying notes from board.		4.09	0.83	HLS
12.	Summarizing every learned material.		4.11	0.84	HLS
13.	Downloading materials from the internet.		4.18	0.70	HLS
14.	Reading difficult subjects.		4.11	0.78	HLS
15.	Drawing some diagrams.		4.05	0.75	HLS
	Grand Mean		**3.90**	**0.87**	**HLS**

Table 1 show that out of 15 item for class work load of senior secondary schools students in Biology in Adamawa State, item 6, 8 and 10 indicated moderate level of class workload while items 1,2,3,4,5,7,9,11,12,13,14, and 15 show high level of class workload. With a grand mean of 3.90, this indicates that the class workload of senior secondary schools students in Biology in Adamawa State was high.

Hypothesis Testing

H_{O1}: Class work load does not significantly predict Senior Secondary Schools Students' Academic Achievement in Biology in Adamawa State, Nigeria.

This hypothesis was tested by regressing Class work load (predictor variable) against students' academic achievement in Biology (dependent variable). Simple Linear regression statistic was used for the analysis. Tables 6a, 6b and 6c display the results respectively.

Table 2a: Model Summary of Regression Analysis between Class Work Load and Students' Academic Achievement in Biology

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.581[a]	.337	.335	7.235

Model summary of prediction between Class work load and students' academic achievement in Biology is presented in Table 2a. The data shows R, R^2 and adjusted

R^2 values of 0.580, 0.337 and 0.335 respectively. The R^2 value 0.337 indicates that 33.7% of the total variation in students' academic achievement in Biology can be accounted for by Class work load. The remaining 66.3% could be attributed to other variables not factored in the model. This results shows that the Class work load predict students' academic achievement in Biology. Table 6b shows the significance of the regression model.

Table 2b: Summary of ANOVA[a] of Regression between Class Work Load and Students' Academic Achievement in Biology

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	10381.03	1	10381.03	198.33	.000[b]
	Residual	20466.03	394	52.34		
	Total	30847.06	395			

*Significant; $p < 0.05$

Table 2b shows that Class work load significantly predicted students' academic achievement in Biology (F $(1, 394)$ = 198.33, $p = 0.000 < 0.05$). This result established that students' academic achievement is positively predicated on class work load.

Table 2c: Summary of Regression Coefficients[a] of Prediction between Class Work Load and Students' Academic Achievement in Biology

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	9.90	3.31		2.99	.003
	Class Work load	0.79	0.06	0.58	14.08	.000*

*Significant; $p < 0.05$.

The data in Table 2c display the coefficients of prediction between Class work load and students' academic achievement in Biology. The Beta value of 58.0% shows that class work load is a predictor of students' academic achievement in Biology. This implies that Class work load significantly predicted students' academic achievement in Biology ($\beta = 0.58$, t = 14.08, $p = 0.000 < 0.05$). Therefore, the null hypothesis of no significant prediction is hereby rejected.

Findings of the Study
The major findings of the study are as follows:
1. Senior secondary schools students of Biology have high level of stress due to class workload in Adamawa State with average mean of 3.90.

Class work load positively predicts academic achievement of students in biology in Adamawa state (F $(1, 394)$ = 198.33, r = 0.580, $p = 0.000 < 0.05$). 33.7%

Discussion of the Findings
This result of the study shows that senior secondary school students in Biology in Adamawa State have high level of class workload with average mean of 3.90 and standard deviation of 0.87, the findings concurred with Atalay, Yildirim and Yildirim, (2016); Scully and Kerr, (2021) and Banob, Kurataa, Matiasa (2015) which in their various studies indicated that class workload is one of the most prominent factor that influence students' academic achievement. Alhebsi, Pettaway and Waller,

(2021) indicated that assignments are the main factor that impacts on students' academic performance. Ilie, Ilie and Ilie, (2021) showed that workload influences students approach to learning differently. However, this study is contrary to the study of Adebayo and Yusuf, (2024) who reported that workload is not the best predictor of the student's achievement. The result of the analysis showed that class workload positively predicts academic achievement of students in biology in Adamawa state. Since the $p \leq 0.05$ level of significance, hence hypothesis 1 is rejected. This finding concurred with Kurata, (2015) who showed significant influence of course work load on students' academic achievement. Dervin and Risquez, (2015) revealed that there is a significant effect of over workload on student academic performance. On the contrary, Smith, (2023) indicated that there is no significant influence of class work load on students' academic achievement. Dochy, Segers, Gijbels and Van (2021) study show no significant relation between perceived workload and students approaches to learning. Also, Smith, (2023) reported that there is no significant relation between perceived workload and students' academic achievement.

Conclusion
Based on the findings of this study, it was concluded that stress due to class workload, study hours, financial difficulty and students-teachers relationship predicts senior secondary schools students' academic achievement in Biology in Adamawa State, Nigeria. The findings indicated that SSSIII Biology students in Adamawa State have high level of stress in school which predicted their achievement. This implies that stress is part of every one's life. Stress can create havoc in the life of the students if not put in check. Under stress conditions the achievement of students' may get hindered and this may lead to poor academic achievement in Biology, and also may hinder national development.

Recommendations
The following recommendations are made based on the findings of the study.
1. Student need to be informed about each subject and understand what is expected of them on each subject

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