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TEACHER LEADERSHIP BEHAVIOUR AS PREDICTOR OF STUDENTS' ACADEMIC SELF-EFFICACY IN SENIOR SECONDARY SCHOOLS IN BAUCHI STATE

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Abstract

This study investigated senior secondary school biology students' perception of teacher leadership behaviour as predictor of their academic efficacy in senior secondary schools in Bauchi State. Two research questions and one hypothesis were considered in this study. A correlational research design was employed to guide the study towards the attainment of the stated objectives. The area of this study was Bauchi State, Nigeria. The population of this study comprised all the public senior secondary school students offering biology in Bauchi State. Multi-stage sampling technique was used in the selection of 404 sample students from the population. Two instruments were used for data collection; Questionnaire on Biology Teacher Leadership Behaviour (QBTLB) and Biology Terminal Achievement Test (BTAT). Data collected were analyzed using mean and standard deviation in answering the research questions. Subsequently, linear regression analysis was used in testing the only hypothesis at a 0.05 level of significance. The results showed that the biology students perceived their biology teachers exhibiting a moderate level of leadership behaviour. Additionally, it was found that students' academic self-efficacy was at a moderate level. Afterwards, it was concluded that the students' perception of teacher leadership has significantly predicted their academic self-efficacy in learning of the subject (Computed *p*-value 0.02, *p*< 0.05). Based on the findings, it is recommended that biology teachers should enhance expression of leadership behaviour in learning environment for development of a high leveled self-efficacy among others.

Key Words: Students' Perception, Leadership Behaviour, Academic Self-Efficacy, Achievement.

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Introduction

Science education basically imparts scientific knowledge, skills and attitude to students, with the aim to nurture their imagination and creativity for addressing national and environmental problems. In another dimension, science education is described by Olashehinde & Olatayo (2013), as an embodiment of facts and principles of all branches of science, particularly biology. However all facets of science possess bounteous prospects for enhancing national development, it is apparent that biology inclined professional courses, such as medicine, paramedical sciences, agriculture and biotechnology have prosperous possibilities to address the persistent food and health insecurity among others (Ajayi, et al,. 2023). To study each of the mentioned courses in Nigerian institutions of higher learning, a candidate must obtain a minimum credit pass in the biology in senior secondary certificate examination (SSCE) (Oghenevwede, 2022). This indeed stresses the prominence of positive achievement in the subject for the mentioned programmes. Unfortunately, the current state of students' achievement in biology is too intimidating (Odukwe, 2021). Hence, there is need for an urgent intervention to douse the menace completely. The term biology was coined from two Latin words: "bios", meaning "life" and "logos", meaning "science of" or "knowledge of" (Ekwu in Ezechi, 2019). It specifically aims to teach aspects related to biodiversity and how it comes to existence. Furthermore, it studies how elements of diversity interact among themselves, as well as with the larger environment (Joda, 2019; Ugwuadu, 2011). Specifically, teaching biology intends to achieve some objectives that have positive bearing to students' self-reliance, social and economic development of Nigeria.

The objectives for teaching biology in Nigerian secondary schools, according to the Federal Ministry of Education (2014), include the provision of adequate laboratory and field skills. In addition to the provision of meaningful and relevant knowledge. Moreover, it envisions to train students to be able to apply scientific knowledge to everyday life in the context of personal, community health and agriculture. This implies that at a point of completion, in the view of Domlong, et al., (2020); Ogechukwu (2016); Onwukwe and Agommuoh (2016), a secondary school biology graduate is anticipated to exhibit some creativeness in the application of biological skills in entrepreneurship, agriculture, environmental conservation, community, personal hygiene and conflict resolution.

Ironically, it seems that the purpose of teaching the subject today has entirely failed headlong (Ityorkyae & Adejioh, 2014). This implies that the objectives of learning biology, such as stated above are no more conspicuous in the students' doings and mannerism (Oghenevwede, 2022). For instance, you hardly find biology students using facts and principles to convince a layman that bats are not members of bird species or cassava is not a stem tuber. These are some evidences that the students' conception in the subject does not rise above the lower cognitive level (Haruna, 2021). In most cases, such students cannot offer first aid to victims of broken bones, burnt skin and breathing problem, despite of the fact that they are trained to be dexterous in similar emergency cases (Adesegun, et al., 2019). Worst still on the other hand, their achievement in the subject in the present time is too undesirable. Most often, academic shortfalls of such type according to Malik (2023) are related to students' negative perception of teachers' interpersonal behaviour, which consequently affects their cognitive and non-cognitive outcomes.

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Teacher interpersonal behaviour according to Sivan and Chan (2021), is a set of teaching behaviour (verbal and non-verbal) demonstrated by a teacher in learning environment. To some extent, it shares some commonalities with discourse patterns. Ugwuadu (2006) defines discourse pattern as a verbal communication pattern between a teacher and students in classroom interaction that have bearing on their learning end result. The teacher interpersonal behaviour according to Zhan and Isma'il (2021) comprise of teacher's attributes, such as leadership, helping, understanding and students' responsibility. Others include uncertain, dissatisfied, admonishing and strict behaviour.

Past empirical studies have evidently reported presence of a strong link between students' perception of teacher interpersonal behaviour and their learning results (Aristiati and Wahyudin, 2022). One may ask: "Why the word "perception" so considered in the similar endeavour?" In response, the perception originally crops up as a result of classroom interaction between teacher and students in learning environment (Zhan & Isma'il, 2021). This perception according to Smith and Ezeife (2010) eventually creates a relationship between a teacher and students, which consequently influences their learning outcomes. This suggests that when the relationship is positive, the learning result will also be the same. While if it is otherwise, the reverse will be the case. In the light of the preceding statement, den Brok, et al., (2004) aver that students' perception is the pivot in which research on teacher interpersonal behaviour rotates. Students' perception of teacher behaviour is often time determined through various instruments, popular among them is the Questionnaire on Teacher Interaction (QTI) developed by Wubbels, et al., (1985). The data collected through QTI is generally analyzed using descriptive statistics (den Brok, et al., 2005). Furthermore, the result of the assessment is purposely used in appraising classroom climate. It is also used in teachers' professional development programme (Sivan & Chan, 2021). For example, in a workshop organized for training teachers on development and presentation of leadership behaviour in learning environment.

Teacher leadership behaviour is described by Nasiran and Biswan (2022) as a teacher's disposition to lead in all classroom activities, including enacting rules and all courses of action. It is also characterized by the teacher's expression of a strong desire to achieve adequate teaching and learning goals. Erstwhile studies have reported the inability of teachers to express concern towards leading students to attain to objectives of lessons as the antecedent of their underachievement in recent period (Espininosa & Gonzides, 2023). Furthermore, Ehigbor (2017), support the prior claim that low academic achievement is related to low expression of teacher leadership behaviour in classroom. These attestations as a matter of fact underscore the need for teachers to ascent the level at which they display leadership behaviour in learning environment for the promotion of learning outcomes, such as academic self-efficacy.

Academic self-efficacy is the students' belief to organize and execute assigned academic tasks successfully (Suarez, 2020; Gerardi as cited in Wallace, 2020; Jafari & Meymand, 2016). However Bandura (2008), assents success as the cornerstone of self-efficacy, records have shown that students' academic success in biology in recent period is too intimidating. Presumably, as a result of perpetuation of low self-efficacy building up in their mind. If this claim is found to be true, then, the Erel's (2020) assertion, which states that highly efficacious students perform well in given tasks is firmly supported. Whereas Ahmed's, et al., (2022) postulation, which declares quick give up for students with pruned belief is also firmly endorsed. With this view in mind, teachers are strongly

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urged to use their resourcefulness to create an enabling environment that cultivates self-efficacy in students alongside leveraging their academic achievement. This will likely be achievable through demonstration of best leadership attribute in learning environment. (Ates & Saylan, 2013)).

In light of the above, earlier studies have confirmed with strong evidence the prevalence of significant association between students' view of teacher leadership behaviour and their academic self-efficacy (Oqvist & Maimstrom, 2017; Lambert in Zhao and Zhang, 2022)). So also Ciloqlu and Ustun (2023); Gannouni and Ramboarison (2016); Isma'il, et al., (2015) authenticate the mentioned conclusion and emphatically implore teachers to express quality leadership behavior in classroom for the development of a functional students' academic self-efficacy.

In spite of the fact that the previous studies have proved the presence and influence of positive teacher leadership behaviour on students' academic self-efficacy in various subject matters and different locations across the continents. The situation in Nigeria seems to be peculiar one for the fact that students' achievement in this time is progressively declining, particularly in biology (Nwuba, et al., 2022). Perhaps, it is as a consequence of truncated level of their academic self-efficacy, which subsequently thwart their achievement in the subject. As stated previously, Bandura (2008), contends that achievement is the cornerstone of academic self-efficacy. Likely, had their biology teachers demonstrated high level of leadership behaviour in their classroom interaction, their self-efficacy will have risen up, and consequently impacted on their achievement. Conceivably, the fact that some students perform excellently with one teacher and demonstrate differently with another actually calls for investigation into cause of the disparity (Reid, 2007). Recently, research related to the influence of teacher interpersonal behaviour on students' educational outcomes is strongly expanding (Van Udeh, et al., 2014). Based on the foregoing discussion, this study investigated the students' perception of teacher leadership behaviour as a predictor of their academic self-efficacy in learning senior secondary biology.

Methodology

The research design for this study was correlational. The population of this study comprised of all senior secondary school students offering biology in Bauchi State. Multi-stage sampling technique was used in selecting the sample of 404 students from the population. The sample size (404) was determined through the application of the Taro Yamane (1973) formula with a 95% confidence interval. Two instruments were used for data collection in this study. These instruments the Questionnaire on Biology Teacher Leadership Behaviour (QBTLB) and Biology Terminal Achievement Data (BTAT). Reliability coefficients 0.88 of the QBTLB was determined using Cronbach Alpha. The data collected from the field study were analyzed using by the use of mean and standard deviation to answer the research questions. Also, linear regression was used in testing the only hypothesis (H_{01}). The decision rule for testing a null hypothesis in this study was $p < 0.05$.

Research Questions

The following questions guided study:

1. What is the level of teacher leadership behaviour in senior secondary school in Bauchi State?

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2. What is the level of students' academic self-efficacy in senior secondary schools in Bauchi State?

Hypothesis

The following null hypothesis was formulated and tested at a 0.05 level of significance in this study:

$H_{O1:}$ Teacher leadership behaviour will not significantly predict students' academic self-efficacy in senior secondary schools in Bauchi State.

Data Analysis

Two research questions formulated were analyzed using descriptive statistics, while the only null hypothesis was tested using linear regression tested at 0.05 level of significance.

Research Question 1: What is the level of teacher leadership behaviour in senior secondary schools in Bauchi State?

Table 1: Mean and Standard Deviation of Level of Teacher Leadership Behaviour as Responded by Biology Students in Senior Secondary Schools of Bauchi State.

S/N	Description	Mean	SD	Decision
1	At what level does your biology teacher explain concepts confidently?	4.21	1.03	HL
2	At what level does your biology teacher notice all that goes on in the classroom?	3.79	1.05	ML
3	At what level does your biology teacher interact in a controlled manner?	3.79	1.20	ML
4	At what level does your biology teacher hold your attention collectively?	3.87	1.14	ML
5	At what level does your biology teacher lead in all learning activities?	3.80	1.19	ML
6	At what level does your biology teacher invite your comments?	3.65	1.27	ML
	Grand Mean	**3.85**	**1.14**	**ML**

SD: Standard Deviation. **Dec:** Decision.

The result of the analysis presented in Table 1 shows the level of teacher leadership behaviour as responded by biology students in senior secondary schools of Bauchi State. Despite the fact that the mean values for the statements describing leadership behaviour range from 3.65 to 3.87, yet, they portray encouraging behavioural expression by the biology teachers. Additionally, the grand mean of 3.85 indicates a moderate level of demonstrating leadership behaviour by teachers in biology classrooms in senior secondary schools in Bauchi State.

Research Question 2: What is the level of students' academic self-efficacy in senior secondary schools in Bauchi State?

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Table 2: Mean and Standard Deviation of the Level of Students' Academic Self-Efficacy in Senior Secondary Schools in Bauchi State.

S/N	Description	Mean	SD	Dec
1.	To what level do you believe to organize practical activities in the biology lab?	3.98	1.18	ML
2.	To what level do you believe in your ability to attempt all the questions at the end of each chapter in biology textbooks?	3.87	1.03	ML
3.	To what level do you believe to explain biology concepts?	3.83	1.04	ML
4.	To what level do you believe to ask questions in biology class?	3.88	1.09	ML
5.	To what level do you believe to use a microscope effectively and efficiently?	3.32	1.33	ML
6.	To what level do you believe to use a computer in biology class?	3.25	1.42	ML
7.	To what level do you believe to do well in biology examinations?	3.88	1.14	ML
8.	To what level do you believe to express your opinion in biology class?	3.75	1.17	ML
9.	To what level do you believe to explain the most difficult biology concepts?	3.43	1.18	ML
10.	To what level do you believe to solve mathematical problems in biology?	3.27	1.25	ML
11.	To what level do you believe to describe biological relationships by using models?	3.60	1.13	ML
12.	To what level do you believe to draw illustrated diagrams in biology?	3.68	1.18	ML
13.	To what level do you believe to establish a biological garden?	3.70	1.19	ML
14.	To what level do you believe to classify biological specimens after collecting them?	3.65	1.19	ML
15.	To what level do you feel assured to tell the history of great biologists?	3.37	1.33	ML
16.	To what level do you believe to write correct biological names of species?	3.60	1.28	ML
17.	To what level do you believe to apply biological principles to solve environmental problems?	3.84	1.16	ML
18.	To what level do you believe to use chemicals in the biology laboratory?	3.06	1.44	ML
19.	To what level do you believe to participate in biological debates?	3.84	1.12	ML
20.	To what level do you believe to demonstrate entrepreneurial aspects of biology?	3.53	1.25	ML
21.	To what level do you believe to manage a biology laboratory?	3.58	1.26	ML
22.	To what level do you believe to catch up sufficiently, when you found yourself lagging in biology lessons?	3.94	1.09	ML
23.	To what level do you believe to endure the stress of difficult tasks in learning biology?	3.96	1.23	ML
	Grand Mean	**3.64**	1.20	ML

SD: Standard Deviation. **Dec:** Decision

Table 2 presents mean and standard values for the descriptors of students' academic self-efficacy in senior secondary school biology classrooms in Bauchi State. From the presentation, the mean values for the descriptors indicate a moderate level of students' belief to execute assigned tasks and personal proposals in biology successfully. The total of 3.64 is indeed a favourable value for students to learn and do biology in senior secondary schools in Bauchi State. Noticeably, the grand score is not all that adequate to enable students to feel capable to approach biological tasks at a high level of competence. Hence, biology teachers in the state have to do much concerning the

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demonstration of positive relationship behaviour, so that the students' perception level of the relationship should be raised above the bar.

Table 3: Regression of Teacher Leadership Behaviour as Predictor of Students' Academic self-efficacy in Senior Secondary Schools in Bauchi State.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1558.438	1	1558.438	9.672	.002[b]
	Residual	66869.504	415	161.131		
	Total	68427.942	416			
	***P*< 0.05**					

Table 3 indicates the existence of a positive significant difference in the relationship between students' perception of teacher leadership behaviour and their academic self-efficacy [F = 9.672 (df 1, 416), $p < 0.05$]. Since it is observed that the computed *p*-value (0.002) is less than 0.05 level significant, therefore, the null hypothesis (H_0) is rejected and concluded that teacher leadership behaviour significantly predicted academic self-efficacy in senior secondary schools in Bauchi State.

Table 4. Model Summary of Teacher Leadership behaviour as a predictor of students' self-efficacy in senior secondary schools in Bauchi State.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.151[a]	.023	.020	12.69375

P< 0.05

Furthermore, 4 indicates the R and R^2 values. The R-value represents a simple correlation of 0.15, which indicates a high degree of relationship. The R^2 demonstrates how much of the total variation in the students' self-efficacy was explained by teacher leadership behaviour in biology classroom of senior secondary schools of Bauchi State. The adjusted R-square value (0.02) indicates that only 2% of the academic self-efficacy was accounted for by the students' perception of teacher leadership behaviour.

Finding of the Study

The following is the findings of this study:

1. Biology students' perception of teacher leadership behaviour has significantly predicted their academic self-efficacy (Computed *p*-value 0.02, *p*< 0.05).

Discussion

The finding of this study presents that biology students' perception of teacher leadership behaviour has predicted their academic self-efficacy in senior secondary schools in Bauchi State. This claim is verified by the outcome of the comparison between computed *p*-value (0.02) and significant *p*< 0.05, thus, justification for a complete rejection of hypothesis one. Similarly, the

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finding corroborates the conclusion submitted by Theleen and den Brok (2020); Rahimi (2019); Oqvist and Maimstrong (2017), which proved the prediction capability of leadership behaviour in forecasting students' academic self-efficacy. In retrospect, academic self-efficacy is defined by Erel (2020) as the belief that a student (he or she) is capable to perform specific academic tasks successfully. In view of this, therefore, it was reported that students with strong self-efficacy develop a deeper interest in activities, which they were assigned to do (Cherry, 2020). In this study, it is obvious that the student's academic self-efficacy is at moderate level. This indicates that biology students in Bauchi State are potential to learn the subject with all their ability and passion in a medium capacity. In a conflicting report, Mainhard, et al., (2013) established that teacher leadership behaviour did not relate to students' self-efficacy. But Larry and Wendt, 2021; Royston (2013) argue with the preceding authors' conclusion and emphatically supported the finding of this study; that a positive relationship thrives between teacher leadership behaviour and students' academic self-efficacy in a positive dimension.

Conclusion

Based on the finding generated from data analysis, it is thus concluded that teacher leadership behaviour is a predictor of students' academic self-efficacy in biology classes of senior secondary schools in Bauchi State.

Recommendations

1. Teachers should raise the level expressing leadership behaviour in learning environment for the promotion of students' academic self-efficacy.
2. Education authorities at all levels of governance should reward teachers found displaying high level of leadership behaviour in learning environment.
3. Teachers should organize hand-on activities in biology classes, which will enable students to interact with them on one-on-one scenario for enhancement of academic self-efficacy.
4. Experienced biology teacher should mentor novice one on how best to demonstrate leadership behaviour for invigoration of academic self-efficacy.
5. Teachers' inspectors from ministries of education should consider expression of leadership behaviour as one of the items for inspection exercise.

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