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RESEARCH ARTICLE

Science Anxiety as a Predictor of Student's Preferred Subject in the Post Junior Secondary Classroom

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Abstract

The world, including Nigeria, is increasingly seeking to improve its educational system to attain the desired scientific-driven society. Thus, education is geared towards science, technology, engineering, and mathematics (STEM). To this effect, Nigeria is investing in science-based education, and the students are encouraged to embrace science in their educational pursuits. Based on this, the present study examined students' subject preference in the post junior secondary classroom based on science anxiety. One hundred and sixty-six students drawn from public and private secondary schools in the Kogi State participated in the study. Their level of science anxiety was assessed with the Science Anxiety Scale (Oludipe & Oludipe, 2019). The simple regression analysis performed on the data revealed that science anxiety statistically significantly predicted the respondent's subject preference. Thus, the study concludes that science anxiety is a positive determinant of student's choice of subject in the secondary school classroom.

Introduction:-

The world is rapidly moving to an age where there will be no development without investing in science and technology(Kihwele, 2014).In recent years, Science, Technology, Engineering, and Mathematics (STEM) education has been promoted in the Global educational system(Carlisle & Weaver, 2018; Gao et al., 2020), and Nigeria is not exempted from this educational reform. STEM education is a multidisciplinary teaching approach, which aims at helping learnersacquire knowledge in science, technology, engineering, and mathematics(He et al., 2021). STEM is an integrative-based curriculum for promoting students' performance in science-related disciplines (Tam et al., 2020). Nigerian students are encouraged to embrace science education. Thus, Nurturing and sustaining students' interest in science is an essential aspect of improving science learning(Mkimbili & Ødegaard, 2019).The advancement of science and technology, especially in developing nations, demands skilled individuals in science disciplines from lower academics(Mabula, 2012). This assertion points to the need to effectively expose young learners to the concept of science. The end of the junior class at the secondary school level in the Nigerian educational system presents an opportunity for the young learners to choose between science and arts discipline as a prerequisite for transiting to the senior class. Insinuations suggest that this condition presents a more significant challenge to most young students at this level. Perhaps, science is hard is a common notion for many students entering a science course (Sanstad, 2018). The choice between science and arts is a growing discourse in the educational system owing to the relevance of science to human development. This study is aimed to assess the level of science anxiety among junior secondary school students and its effect on their preferred academic discipline.

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Science subjects such as mathematics, chemistry, and physics are ubiquitous in the educational landscape of any nation. Learning and passing science subjects such as mathematics have been a prerequisite for academic transition in all levels of education. Although teaching and learning of science are contingent on mental capabilities, it has been observed that other psychological factors such as attitude and emotion play a vital role in the sciences. Over the years, the critical role of student's feelings in educational settings has attracted wide research attention(Robertson, 2015). Perhaps, evidence exists that seems to suggest that emotions exert a significant impact on students' learning and achievement(Pekrun & Linnenbrink-Garcia, 2014; Roos et al., 2020). Science anxiety is among the well-researched emotional condition inhibiting student's interest in the science discipline. The construct entails the psychological state of tension and apprehension occasioned by scientific-related events. Science anxiety refers to the learner's negative emotions about learning science(Megreya et al., 2021). This feeling of science anxiety is universal and spread across all cultures and ages of students(Sanstad, 2018). Anxiety has a vital role in developing a positive attitude toward science lessons and increasing their achievement (Ucak & Say, 2019). Accordingly,Udo et al. (2004)attributed students' lack of interest in science and lacking motivation to participate in science courses to science anxiety. This phenomenon is implicated in severe psychological and psychosomatic symptoms ranging from loss of hope to total withdrawal. Accordingly, research contends that students with a higher level of science anxiety tend to avoid activities and situations that involve science (Brownlow et al., 2000). Hence, they prefer subjects that are nonscience.

Numerous studies have investigated the construct of science anxiety in recent times (Ahmed et al., 2017; Bryant et al., 2013; Dickson et al., 2017; Griggs et al., 2013; Güzeller & Doğru, 2012; Henschel, 2021; Kuan & Tek, 2007; Küçükaydın, 2018; Mallow et al., 2010; Nitu Kaur & Vadhera, 2020). Several factors have been found to trigger science anxiety. For instance, the purported belief that mathematics, physics, and chemistry are complex has created science-related fear among many students at the early education level. Accordingly, science anxiety is possible due to classroom conditions such as exposure to affected teachers and peers. Kaya and Yildirim (2014)explored science anxiety among failing students and found that science anxiety resulted from unpleasant classroom activities, fear of tests, teacher attitudes, and parent attitudes. The present study's focus is on the effect of this construct on students' future fields of study.

In Nigeria, including other nations, the third year in the secondary education system marks the end of junior secondary class. Thus, this stage qualifies the youngsters to transit to the senior class. However, transition to the senior level is the first step in the educational specialization. The students are given the opportunity to enroll in a specific academic discipline (e.g., science or arts). Consequently, the period is the primary determinant of the direction taken by students in their future endeavors. This period presents a challenge to the youngsters. So many factors have been identified as correlates of student's choice of subject in the post junior level. For example, gender, peer group, parental influence, family income, student's potentiality, perceived usefulness of subject area, teacher's influence, and career aspiration have been found to influence student's preferred subject area. (Adams & Salome, 2014; Javed, 2018; Kao & Shimizu, 2020; Macphail, 2002; Michael & Asuquo, 2020; Oriahi et al., 2010; Sota & Agi, 2020). The current study aims to bridge the gap between subjects' preferences in the pre senior secondary class that contribute much to students' future academic and career paths, including national development. Thus, the study's primary objective is to determine students' preferred subject in the post junior secondary level based on science anxiety.

Hypothesis

Because of the objective of the study, the below hypothesis was developed to guide the study:
Science anxiety will significantly predict student's preferred subject choice.

Method:-

The study population comprised secondary school students in Lokoja, Ankpa, and Okene in Kogi State, Nigeria. A total of one hundred and sixty-six (n=166) in their third-year junior secondary school students were pooled from different public and private schools within the study parameter. The respondents comprised males and females aged 12-15 years and mean age of $M = 13.04, SD = 0.98$ years. A cross-sectional survey design was adopted for the study.

Measures:-

Science anxiety was measured using the modified Science Anxiety Scale (Oludipe & Oludipe, 2019). The scale was designed to assess the student's level of anxiety related to science subjects at the junior secondary school level. The scale comprised section A that contains demographic information, including the preferred subject, and Section B,including the 18 items scored in a 5-point Likert form. A higher score indicates high science anxiety. The scale recorded a Cronbach alpha 0.96 following a pilot study.

Procedure:-

Research assistants were employed, and they were instrumental to data collection. Permission was obtained from the relevant heads of the public and private schools selected for the study. After that, students in junior secondary school three (jss3), as commonly used in Nigeria, were gathered and prepared for the study. Indeed, they were informed of the study's purpose and urged to withdraw from the study any time they wanted. Only the students who consented to the study were given the research instrument. In all, a total of one hundred and eighty questionnaires were distributed to the students. However, only one hundred and sixty-six of the scale was adequately filled and was subjected to statistical analysis.

Result:-

Firstly, the study attempts to ascertain the mean and percentage of participants' responses regarding their preferred subject. The table 1 shows that 62% of the respondents with (M= 1.95, SD= 0.21) selected arts as their preferred subject, while, 33% of the respondents (M = 1.31, SD = 0.46) preferred sciences as their subject.

Table 1:- Table showing the mean, standard deviation, and percentage of the respondent's preferred subject.

Choice of Subject	N	Mean	SD	%
Arts Subject	103	1.9515	.21596	62
Science Subject	63	1.3175	.46923	38
Total	166	1.7108	.45474	100

A simple linear regression analysis was employed to test the study's assumption, which states that science anxiety will significantly predict students' preference of subject in the post junior class. The analysis showed that science anxiety statistically significantly predicted the respondent's preferred subject F (1,164), 139.984, P<.000. Thus, our expectation that science anxiety will substantially predict student's chosen subject was confirmed.

Table 2:- Table showing the result of the linear regression analysis conducted to determine the influence of science anxiety on the preferred subject.

	95% CI for B						
	B	LL	UL	SEB	βR^2	t	Sig
Constant	2.582.43	2.74	.078			32.994	000
Science Anxiety	-.63	-.74	-.52	.054	-.679	.563-11.831	000

Note. B = Unstandardized regression coefficient; CI = Confident Interval; LL = Lower Limit; UL = Upper Limit; SEB = Standardized error of the coefficient; β = Standardized coefficient; R^2 = Coefficient of determination. *P<.000.

Discussion:-

The current study investigated science anxiety as a psychological construct that could determine junior secondary school student's preference of subject in the post junior class level. The linear regression analysis conducted on the data revealed that science anxiety positively and statistically predicted the student's choice of subject. The present finding entails that student who scored high on science anxiety are most likely to prefer arts subjects in their senior secondary class. Thus, their decision is extended to the higher education level. Generally, educational preference in

this direction ensures that the quest for scientific knowledge is never attained. Possibly, students who have resorted to arts based on the fear of science are likely to experience low performance. This assertion is reflected in the reinforced state of anxiety such that an encounter with a science subject in the future classroom could worsen the anxiety state, impair performance. Perhaps, research has provided evidence of anxiety and poor performance (Adhiambo Nyayieka et al., 2020; Afolayan, 2018; England et al., 2019; Sandu et al., 2021).

Similarly, the result indicates that students who experience no anxiety in relation to science are keener in academic pursuit and possess a favorable attitude towards science subjects. Thus, they are more committed to studies and have less opportunity for academic withdrawal. Accordingly, they progress in the direction expected to achieve the goal of a scientific-driven society. However, from the finding, it is possible that the students made their choice out of anxiousness and not really because they understood their preference. Hence, the mechanism by which science-related anxiousness correlates with the choice of the subject remains unclear.

Limitations, strengths, and future directions

Because of the small sample size and homogeneousness, it becomes imperative to caution about the generalization of the present research result. Despite the practical limitations, the present study contributes to the anxiety literature by identifying science anxiety as a determinant of choice of subject among junior secondary school students. Thus, the result broadens our knowledge about the negative impact of science anxiety on junior secondary school students. Moreover, in our understanding, no study has attempted to investigate the predictive effect of science anxiety on student's preferred subject at the junior level in the Nigerian context. Hence, justifying the current study. Future researchers should endeavor to utilize data from more inclusive sources and establish a cause-effect relationship.

Conclusion:-

The linear regression analysis conducted on the study data proved the critical effect of science anxiety in predicting students' preferred subject at the junior secondary school level. Indeed, the research hypothesis was supported by the result of the study. Therefore, it is concluded that science anxiety is a critical predictive variable in a student's choice of study and future career aspiration. The finding can provide valuable data to psychologists, career counselors, and educators in achieving their various purposes relating to future directions and career choices. Also, the result offers parents and guardians the opportunity to filter the preferences of their school children. Therefore, it is recommended that school administrators and counselors invest in a robust approach that will broaden the youngsters' cognitive processes. Also, interventions aimed at curbing academic-related anxieties should be included in the curriculum.

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