# Test Anxiety and Academic Stress as Predictors of Secondary School Students` Academic Achievement in Physics

Okeke Agnes O.[1] & Ocheni Christopher A.[2] & Oguguo Basil C. E.[3] & Asongo Stanley T.[4]

[1,2,3, &4]Department of Science Education, University of Nigeria, Nsukka, Nigeria
Correspondence: Ocheni Christopher A., University of Nigeria, Nsukka, Nigeria
Email: christopher.ocheni.pg88818@unn.edu.ng

**Abstract:** Test anxiety and academic stress were investigated as predictors of students' academic progress in Physics in this study. A correlational research design was used. The study was guided by three research questions and three null hypotheses. The research was conducted in Education Zon C, Benue State, Nigeria. The study's population consisted of 2692 SS II Physics students from public schools in the area. The study used a sample of 337 students drawn using simple random sampling. For data collection, the researchers employed the Physics Test Anxiety Inventory (PTAI) adapted from Spielberger (1980), the Physics Academic Stress Scale (PASS) adapted from Burge (2009), and the Physics Achievement Test (PAT) designed by the researchers. Four specialists faced validated the instruments. Using the Cronbach alpha approach, the reliability of the PTAI and PASS were estimated to be 0.73 and 0.84, respectively, while the reliability of the PAT was estimated to be 0.76 using the KR-20 formula. Regression analysis was utilized to answer the study questions, while ANOVA was employed to test the hypotheses made at the 0.05 level of significance. The result revealed that the proportion of variation students' achievement in Physics that may be attributable to test anxiety and academic stress, is independently and jointly significant. Based on this conclusion, it was suggested that adequate learning resources, as well as a functioning and suitable learning environment, be made available in order for students to learn effectively. This will help them to be mentally ready for any form of testing or examinations.

**Keyword:** Science, Physics, Academic Achievement, Test Anxiety, Academic Stress

## 1. Introduction

Science as a body of knowledge is a fundamental part of human existence and development. This is because science has enabled mankind to advance in areas of knowledge, nation building capital development and, among others. The knowledge and products of science have consistently placed developed nations above developing and underdeveloped nations in terms of technological advancement and resource output. As a result, any country wishing to be at the good side of development and advancement in knowledge must prioritize educating the citizens in the area of sciences. Perhaps, one of the major factors used in placing a country as developed, or developing nation is her expertise and the extent of utilization of the knowledge acquired through science. Nigeria as a developing country is not left

out of this quest for the knowledge of science as the country desires to rise to the level of other developed nations.

This knowledge of science according to wood (2020) is what one learns from the procedures and processes of science which involves experimentation and collection of data. The application of this knowledge characterizes the different divisions of science which include earth science, life science and physical science.

Physical science is concerned with the organic and inorganic aspects of the world, such as matter and energy. It provides one with the opportunity of categorizing the universe based on quantities such as mass, volume, weight, and other conventional objective metrics. This category includes Astronomy, Chemistry, Mathematics, and Physics, among others, (Foist, 2020). Chemistry focuses on the content or composition of matter, its properties, how it reacts and its structure (Team Leverage Edu: TLE, 2019), Mathematics is concerned with the various ways in which the properties of matter are related, while Physics is studies the interactions or interrelationship between matter and energy.

Among all these branches of science, Physics has been regarded as fundamental in the study of other aspects of science (Omosewo, 2009). Physics as a subject play's significant roles in the development of mankind. Understanding physics enables one to become knowledgeable in other areas of sciences (Patrick, 2018). This makes it very important for one to have adequate knowledge of physics. Physics knowledge is essential for understanding the concepts of physics. Physics explains the universe using mathematical concepts. It examines the galaxies, planets, atoms, quarks, and everything in between as well as the fundamental forces of the universe and how they interact with matter (Patrick, 2018). According to Norwegian University of Science and Technology (NUST) (2016) Physics studies the universe using experiments, measurements, and mathematical analysis so as to discover quantitative physical laws within the universe. In a similar way, Usman and Abubakar (2019) referred to physics as the foundation and bedrock of science and technology that provides the basic knowledge and insight about laws and principles governing the world of sciences. Thus, one could define Physics as a branch of physical science that studies the behavior of matter, its properties and energy, establishes relationship between the properties and uses the relationship to state laws and principles governing the physical behavior of matter in relation to energy.

According to Usman and Abubakar (2019), Physics has continuously enhanced the speedy development of our present-day society through its discoveries. The authors further stated that Physics contributes and improves the quality of life in the society through the application of its knowledge. Patrick (2018) equally stated that physics theories are responsible for the advancement in electronics which gave rise to breakthrough in the world of Information and Communication Technology (ICT).

It is perhaps imperative that the contributions of physics to science and technology which in turn result to greater improvement in areas of development, improved economy, social well-being among others in the country is glaring. One may say that it is on this ground that the government of Nigeria realizing how indispensable physics is; has mandated its inclusion into the secondary school curriculum. This in a way, position physics as a very vital subject for the development of the nation. Thus, in line with the importance of physics to national development it is necessary for every secondary school student to have a high academic achievement in physics.

Researchers have proposed numerous explanations for academic success. In the definition of Osa-Edo and Iyamu (2012), academic achievement may be regarded as success or failure in a school based on theoretical and practical learning. Ezema (2012) referred to it as the pursuit and realization of a goal that one has set for oneself. Furthermore, Onukwufor and Ugwu (2017) referred to academic achievement as a score which reflects the level of success a learner has attained after teaching and learning had taken place. In essence, it indicates the extent to which learning has taken place. In the context of this study, academic achievement is the attainment of academic goal and target or otherwise by a learner at the end of teaching and learning processes.

From the forgoing, one could say that academic achievement plays significant roles in the education system. However, the achievements of students in physics over the years have not been very impressive. Amuche et al., (2014) stated that the performance of candidates in both West African Senior School Certificate Examinations (WASSCE) as well as National Examinations Council (NECO) in physics has been poor for many years now. More so, according to Jegede and Adedayo (2016), as well as Ojediran, (2016), students perform very poor Physics in public examinations (Senior School Certificate Examinations: SSCE) between 2010 and 2015. This is apparent in the breakdown of the 2010 to 2015 results of SSCE examinations conducted by West African Examinations Council (WAEC) as shown by Ojediran (2016) with only 32.64%; 26.80%; 38.81%; 29.17%; 29.27% and 31.28% candidates respectively having credit pass in the 2010, 2011, 2012, 2013, 2014 and 2015 physics results.

Consequently, the WAEC Chief Examiner`s Reports from 2015 to 2019 show that in physics paper 2; the mean scores of students are 19, 19, 15, 26 and 26 with standard deviations of 9.90, 8.77, 8.43, 9.80, 9.59 and candidates' number of 658393, 658669, 704504, 728924 and 762340 respectively. Considering the means as stated above for the period of five years, it is obvious that none of the means of students` achievement in physics is near the expected mean score of 50 as an average. This typically indicates that the achievements of students in Physics is poor.

To address this problem, a number of factors have been identified by many researchers to be responsible for this ugly situation of poor achievement in Physics. King`Aru (2014) pointed out that negative attitude of students toward science subjects, lack of laboratory resources and textbooks are factors contributing to poor students` achievement in physics. Furthermore, teacher's factors which include lack of interest in teaching, lack of laboratory and library; parental factors which include inadequate finance from parent(s) to pay students fees and provide other learning materials; and students` factors which include cultism and poor study habits of students all affect students` academic achievement in physics (Alache, et al., 2017). Oluwasegun and Ekamoye (2018) added that large number of students in classrooms, teaching methods among others are also factors giving rise to students` poor academic achievement in physics. In line with the above factors, attempts were made to solve the problem of continuous decline in students' academic achievement in physic by employing professional and qualified physics teachers, providing relevant instructional materials, well-equipped and functional laboratories, training and retraining of physics teachers, adoption of innovative teaching methods by teachers (Agboghoroma & Oyovwi, 2015) as well as organizing seminars and workshop to improve physics teachers and among others (Okeke, 2019).

The identification of these factors above as an attempt to by educational scholars to solve the issue of poor achievement of students in physics proved to be ineffective as the achievement of students in physics has

continued to decline as reported by WAEC chief examiners` report from 2015 to 2019. The implication of this is that the nation`s quest to improve in areas of science and technology will not be feasible. This situation is worrisome to teachers, parents, and educational stakeholders. There is need therefore to consider the finding of Beharu (2018) that psychology factors such as test anxiety and academic stress among others could also affects students' academic achievement.

Test anxiety has become a part of the academic world. It is a self-preoccupation that is displayed in the form of self-minimization, hence resulting in damaging mental evaluation which could lead to concentration issues, bad physiological reactions and academic failure (Dawood et al, 2016). Hamzah et al (2018) also referred to test anxiety as examination anxiety which occurs in examination situations. It can either impact students positively or negatively. In this study, test anxiety is any emotional or psychological factor which can either impede or increase an individual`s achievement in an examination or testing situation. The findings of Onukwufor and Ugwu (2017) revealed that test anxiety significantly predicts achievement of students. However, Khizar, Anwar and Khanum (2015) contradicted this report that test anxiety and academic achievement of students are not related. This inconsistencies in the findings of researchers require further investigation on test anxiety. In line with the above, it is relevant to determine whether or not test anxiety can predict students` achievement in physics. More so, when students become very worried about their academics, it could lead to academic stress.

Academic stress which is an academic related demand have been explained by many researchers. It refers to academic related demand that seem to be more than students` abilities to handle (Wilks, 2008). Thus, it deals with mental pain relating to academic setbacks or failure in academic endeavors with respect to academic expectations. Lal (2014) referred to academic stress as a mental distress in line with some projected frustration which could bring about academic failure or even lack of knowledge of the likelihood of such failure. Contextually, academic stress may be seen as demands or undue pressure experienced by students that appears threatening to their academic achievement. In the report of Azila-Gbettor, et al (2015), it was revealed that academic stress does not predict academic achievement of students, however, the findings of Kaur and Kaur (2016), and Alam and Halder (2018) disputed, stating that academic stress predicts academic achievement. This disparity in the findings of the above researchers necessitated further investigation. Thus, it is important to find out whether or not academic stress can predict achievement of school students in Physics.

## 2. Literature Review

Chukwu (2014) investigated test anxiety, students` academic achievement, and interest in Geometry to see how they are related among students, the result showed a positive relationship. In a study of Khizar et al., (2015) on examination anxiety and academic achievement among undergraduate students, a non-significant relationship was found. Onukwufor and Ugwu (2017) also reported test anxiety as being a significant predictor of students` achievement among other things in a study on self-concept, test anxiety, and success motivation of students in Physics. In their study on test anxiety and performance of undergraduate students, Balogun, et al., (2017) found that test anxiety had a substantial detrimental impact on students' academic performance. Similarly, Kaur and Kaur (2016) conducted research on academic achievement and academic motivation as indicators of academic stress in secondary school students and reported a negative association between academic stress and student academic achievement. Alam (2016)

also conducted research on academic stress and test anxiety as predictors of secondary school students' achievement; the findings revealed a negative association between academic stress, test anxiety, and student academic achievement. The studies above showed that majority of this study was done considering only the test anxiety or academic stress without examining both variables together. Even the study of Alam (2016) that did was not carried out in Physics. More so, none of the studies was found to be carried out in Education Zone C of Benue state. Because of the difference in socializing environment of students, a stressor in one location may not be considered stressor in another location. It is essential to therefore, determine if test anxiety and academic stress can predict the achievement of students in Physics.

The foregoing shows that students` achievement in Physics has been very poor in Nigeria as reported by Alachi, et al (2017), and Ankeli (2020). Efforts made by relevant stakeholders in order to address this problem of poor achievement in Physics among students have proved to be ineffective. More so, inconsistencies have been observed in the findings of researchers on the reason behind this poor academic achievement experienced by students in Physics. It is against this backdrop that the present study sought to determine whether or not test anxiety and academic stress could predict students` achievement in Physics. The following questions were addressed.

1. What proportion of students` achievement in Physics is accounted for by test anxiety?
2. What proportion of students` achievement in Physics is predicted by academic stress?
3. What proportion of students` achievement in Physics can be jointly predicted by test anxiety and academic stress?

## 3. Materials and Method

### 3.1 Research Design

This study adopted a correlational research design. This design permits establishing of relationship between two or more variables (Nworgu, 2015). Thus, it is considered most appropriate for this study as it allowed the researcher to establish the relationship between test anxiety, academic stress and academic achievement of students in Physics.

### 3.2 Participants

The population of this study comprised 2696 senior secondary school II (SSS II) Physics students for 2019/2020 academic session in the 85 public secondary schools in Nigeria. Three hundred and thirty-seven (337) participants estimated using Taro Yamen (1967) formula was drawn and used for the study. The technique of simple sampling (balloting with replacement) was used to draw the sample. This was to ensure that all participants stand an equal chance of been drawn into the final sample.

### 3.3 Instruments

The instruments: Physics Test Anxiety Inventory (PTAI) adapted from Spielberger (1980), Physics Academic Stress Scale (PASS) adapted from Burge (2009) and Physics Achievement Test (PAT) designed by the researchers were used in the study. The PTAI with 14 items had response items on a 4-point scale of strongly agree (SA), agree (A), disagree (D) and strongly disagree (SD) with numeric value of 4, 3, 2

and 1 respectively. The PASS instrument which contained 19 items was structured with responses options of extremely stressful, highly stressful, moderately stressful, stressful and not at all stressful with scoring of 5, 4, 3, 2 and 1 respectively. The PAT on the other hand contained 20 multiple choice test items; each item has four (4) options with one (option) as the right response of key and others as alternatives or distractors. Each right response was awarded one (1) mark while an incorrect response was awarded zero (0).

## 3.4 Reliability and Validity of Instruments

The instruments were all face validated by four experts. The PTAI and PASS instrument were construct validated using factor analysis with principal axis factoring based on varimax rotation. Factorially pure items with factor loading value of 0.4 as recommended by Sevens (2002) were selected and used for the study. The PAT instrument was subjected to content validation using table of specification in line with the modified blooms` taxonomy by Anderson and Krathwohl (2001). A total of 14 items and 19 items were arrived at for PTAI and PASS respectively after factor reduction while the PAT instrument contained 20 items. The instruments were trial tested on 52 students and reliability indices of 0.73, 0.84 were obtained for PTAI, PASS instruments respectively using Cronbach alpha method while index of 0.76 was estimated for PAT using KR-20 formula.

## 3.5 Analysis of Data

A face-to-face method was employed in the collection of data to ensure a 100% return. The data collected were converted to percentages to ensure equivalence (score standardization). SPSS version 23 was used to analyze the data collected. Simple linear regression was used to answer research questions 1 and 2, while multiple regression was used for research question 3. The hypotheses were tested using ANOVA at a significance level of 0.05. Correlation coefficients of 0-0.30 were considered low, 0.31-0.70 moderate and 0.71-1.00 high (Nworgu (2015).

## 4. Results

The regression analysis for the proportion of students' achievement in Physics that is accounted for by test anxiety is shown in Table 1. The obtained correlation coefficient (R) is 0.29. This suggests that test anxiety and academic achievement in Physics have a low relationship. $R^2$ is the coefficient of determination which is 0.08. This suggests that test anxiety is responsible for 8% of the variation in students' achievement in Physics. The result in Table 1 indicates the regression analysis for the prediction of academic stress on students` achievement in Physics. The result shows a correlation coefficient (R) of 0.21 which implies a low relationship. A coefficient of determination ($R^2$) of 0.04 obtained means that 4% of students` achievement in Physics is predicted by academic stress. Table 1 shows the regression analysis for the proportion of students` achievement in Physics that is jointly predicted by test anxiety and academic stress. The result revealed a correlation coefficient of 0.29. This translates to a low relationship. The coefficient of determination, $R^2$ of 0.09 means that 9% of the students` achievement in Physics is jointly predicted by test anxiety and academic stress.

Table 1: Test anxiety and academic stress predicting achievement in Physics

| Model | N | R | $R^2$ |
|---|---|---|---|
| Test Anxiety | 337 | .286[a] | .082 |
| Academic Stress | 337 | .211 | .044 |
| Test Anxiety x Academic Stress | 337 | .293 | .086 |
| a. Predictors: (Constant), Test Anxiety, Academic Stress, S= Significant | | | |

The analysis of data in Table 2 on the significant of the prediction of test anxiety on academic achievement in Physics shows that F= 29.943, p =0.000. Since the 0.000 is less that the level of significance of 0.05, H01 is rejected. Hence, test anxiety significantly predicts students` achievement in Physics.

Table 2: ANOVA result of test anxiety predicting achievement in Physics

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 2822.928 | 1 | 2822.928 | 29.943 | .000[b] |
| | Residual | 31582.743 | 335 | 94.277 | | |
| | Total | 34405.671 | 336 | | | |

Note: p<0.05

Result from Table 3 on the significant of prediction of academic stress on achievement in Physics shows F= 15.595, p= 0.000. Since the p=0.000<0.05 level of significance, H02 is rejected. Conclusion drawn is that academic stress predicts significant proportions of students` achievement in Physics.

Table 3: ANOVA result of academic stress predicting academic achievement in Physics

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 1530.401 | 1 | 1530.401 | 15.595 | .000[b] |
| | Residual | 32875.270 | 335 | 98.135 | | |
| | Total | 34405.671 | 336 | | | |

Note: p<0.05

Result in Table 4 indicates that an F-ratio= 15.678 and a p= 0.000 was obtained. Because p=0.000 is less than 0.05 level of significance, H03 is rejected. Therefore, the proportion of students` achievement in Physics that can be jointly predicted by test anxiety and academic stress is significant.

Table 4: ANOVA result of test anxiety and academic stress predicting achievement in Physics

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 2952.884 | 2 | 1476.442 | 15.678 | .000[b] |
| | Residual | 31452.787 | 334 | 94.170 | | |
| | Total | 34405.671 | 336 | | | |

Note: p<0.05

## 5. Discussion

The result shows that test anxiety predicts 8% of the achievement of students in Physics. This result implies that the level of test anxiety experienced by students could go a long way to determine how they achieve academically. Further analysis indicates that test anxiety significantly predicts students` achievement in Physics is significant. This result is not surprising since test anxiety could bring about restlessness, worry and lack of concentration among students which could have led to their test anxiety in Physics, thereby predicting their academic achievement. This result aligns with the report of Khizar, et al., (2015), Onukwufor and Ugwu (2017), and Balogun, et al., (2017) who respectively reported that test anxiety has a significant impact on the performance of students.

The result of the analysis revealed that academic stress predicts 4% of students` achievement in Physics. Further analysis shows that academic stress significantly predicts the achievement of students` in Physics. This implies that students` level of academic stress affects their academic achievement in Physics. This result is possible because, mental distress, undue pressure or academic demands could raise students` level of academic stress, and as a result it predicted their achievement in Physics. This result is strengthened by the finding of Kaur and Kaur (2016), and Alam (2016) that academic stress significantly predicts students` academic achievement.

The result showed that the proportion of students` achievement in Physics that can be jointly predicted by test anxiety and academic stress 9%. Further analysis revealed a significant joint prediction. This result means that the level of test anxiety and academic stress experienced by students` determines achievement in Physics. This result could have been like this because psychological, social and emotional factors share relationship with students` academic achievement. Thus, as students become worried, tensed, and pressured academically, their academic achievement is likely to be affected. This finding collaborates with the findings of Alam (2016) that both test anxiety and academic stress predicts students` academic achievement significantly.

## 6. Conclusion

In line with the result obtained from this investigation, it is concluded that test anxiety and academic stress have a joint and independent significant prediction on the achievement of students in Physics. Thus, when students are anxious or stressed out academically, their academic achievement in Physics could most likely be affected.

## 7. Recommendations

The recommendations highlighted below are based on the findings of this study.

1. The Ministry as well as relevant education stakeholders should ensure that workshops, conferences and seminars on how to deal with students` test anxiety and academic stress are organized for students, teachers and parents.
2. Adequate learning materials, functional and conducive learning environment should be provided in order to enable students learn well. This will help them to be mentally ready for any form of testing or examinations.
3. Guidance and counseling services should be made available and functional in schools for all students to access. This will enable the students get the right guidance direction in their academics. Hence, reducing academic stress and worry.
4. Teachers should endeavor to follow lesson timetable and also create revision time and enough study time for students to prepare for examination. This will help reduce test anxiety and academic stress.

## References

Agboghoroma, T. E., & Oyovwi, E. O. (2015). Evaluating effect of students` academic achievement in identified difficult concepts in senior secondary school in Delta State. *Journal of Education and Practice, 6*(30), 117-125.

Alachi, S., Owadara, A. B., Nwosu, C. O. & Njoku, C. (2017). Academic achievement of physics education students` in two Nigerian universities. *Journal of Research and National Development, 15*(1).   https://www.ajol.info/index.php/jorind/article/view/158502

Alam, M. (2016). Study of academic stress and test anxiety as predictors of academic achievement of secondary school students. *European Academic Research, 4*(2), 1353-1369.

Alam, k. & Halder, U. K. (2018) Academic stress and academic performance among higher secondary school students: A gender analysis. *International Journal of Creative Research Thoughts, 6*(1), 687-692.

Amuche, C. I., Amuche, B., Bello, A. & Marwan, M. B. (2014). A correlational analysis of private and public secondary school students' performance in WAEC and NECO conducted physics examinations. *International Journal of Education and Research, 2*(10), 407-416.

Anderson, L.W., & Krathwohl, D. R., (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's Taxonomy of Educational Objectives*. New York: Longman.

Ankeli, G. O. (2020). Effects of mentoring enhanced strategy on self-regulation in physics among secondary school students in Benue State. *Journal of Education, Society and Behavioral Science, 33*(5), 55-62. https://doi.org/10.9734/JESBS/2020/v33i530225

Azila-Gbettor, E.M., Atatsi, E. A., Danku, L. S. & Soglo, N. Y. (2015). Stress and academic achievement: Empirical evidence of business students in a Ghanaian polytechnic. *International Journal of Research in Business Studies and Management, 2*(4), 78-98.

Balogun, A. G., Balogun, K. S. & Onyencho, C. V. (2017). Test anxiety and academic performance among undergraduates: The moderation role of achievement motivation. *The Spanish Journal of Psychology, 20*(14), 1-8. https://doi.org/10.1017/sjp.2017.5

Beharu, W. T. (2018). Psychological factors affecting students` academic performance among freshman psychology students in Dire Dawa university. *Journal of Education and Practice*, *9*(4), 59-65.

Chukwu, L. O. (2014). Relationship among test anxiety, academic achievement and interest of senior secondary school students in geometry in Enugu State. (*Unpublished master's thesis), University of Nigeria, Nsukka.* Retrieved from https://oer.unn.edu.ng/read/relationship-among-test-anxiety-academic-achievement-and-interest-of-senior-secondary-school-students-in-geometry-in-enugu-state

Dawood, E., Al-Ghadeer, H., Mitsu, R., Almutary, N., & Alenezi, B. (2016). Relationship between test anxiety and academic achievement among undergraduate nursing students. *Journal of Education and Practice, 7*(2), 58-65.

Ezema, E. O. (2012). Effect of total communication on teaching English Language to pupils with hearing impairment in Enugu. (*Unpublished master`s thesis), University of Nigeria, Nsukka.*

Foist, L. (2020). The main branches of science. https://study.com/academy/lesson/the-main-branches-of-science.html

Hamzah, F., Mat, K. C., Mahyiddin, N., & Bhagat, V. (2018). Test anxiety and its impact on first year university students and the over view of mind and body intervention to enhance coping skills in facing exams. *Research Journal of Pharmacy and Technology. 11*(6), 2220- 2228. https://doi.org/10.5958/0974-360X.2018.00411.0

Jegede, S.A. & Adedayo, J.O. (2016): Enriching Physics Education in Nigeria towards enhancing a sustainable technologies development. *Greener Journal of Educational Research, 3*(2) 80-84.

Kaur, K. & Kaur, P. (2016). Academic achievement and achievement motivation as correlates of academic stress among secondary school students. *International Journal of Scientific Research, 5*(11), 674-675.

Khizar, A., Anwar, M. N. & Khanum, H. (2015). Relationship between examination anxiety and academic achievement among university students. *Elixir Social Studies (online journal), 87,* 35644-35646

King'Aru, J. M. (2014). Factors contributing to the poor performance of science subjects. A case of secondary schools in Kawe division, Kinondoni Municipality. *Doctoral dissertation, University of Tanzania*

Lal, K. (2014). Academic stress among adolescents in relation to intelligence and demographic factors. *American International Journal of Research in Humanities, Arts, and Social Sciences, 5*(1), 123–129.

Norwegian University of Science and Technology (2016). Physics education. https://www.ntnu.edu/physics

Nworgu, B. G. (2015). *Educational research: Basic issues and methodology (3ʳᵈ ed.).* Nsukka: University Trust Publishers

Okeke, U. K. (2019). Students' achievement and low enrolment in physics: The place of Physics teachers and other necessary resources. (*Unpublished dissertation), University of Ibadan, Ibadan.*

Ojediran, I. A. (2016). Philosophical relevance of Physics teacher education curricula in south wester Nigerian universities to secondary school Physics curriculum. *Journal of Education & Social Policy, 3*(2), 128-134

Oluwasegun, G. O. & Ekomaye, G. (2018). An analysis of the university of Jos remedial students' achievement in Physics (2007-2010). *International Journal of Scientific and Research Publications*, *8*(12), 773-779.  http://dx.doi.org/10.29322/IJSRP.8.12.2018.p8496

Omosewo, E.O. (2009). Views of Physics teachers on the need to train and retrain physics teachers in Nigeria. *International Multi-Disciplinary Journal of African Research Review. 3*(1), 314-325.

Onukwufor, J. N & Ugwu, C. J (2017). Self-concept, test anxiety and achievement motivation as predictors of academic achievement in physics among secondary school students in Rivers State, Nigeria. *Journal of Education and Practice, 8*(33).

Osa-Edoh, G. I. & Iyamu, F. I. (2012). Social life adjustment and academic achievement of adolescents in Edo State: Implication for counselling. *Ozeam Journal of Applied Sciences 5*(2), 159-167.

Patrick, B. (2018). Importance of Physics in the modern world. https://sciencing.com/importance-physics-modern-world-6657166.html

Stevens, J. P. (2002). *Applied multivariate statistics for the Social Sciences (4th ed.).* Hillsdale, NJ: Erlbaum.

Team Leverage Edu (2019). Branches of science. Retrieved from https://leverageedu.com/blog/branches-of-science/

Usman, I. S. & Abubakar, Y. B. (2019). Senior secondary school Physics curriculum content coverage and student's achievement in Katagum educational zone, Bauchi State, Nigeria. *International Journal of Scientific Research in Education, 12*(4), 489-499.

West African Examination Council (2019). WAEC chief examiners` report. Physics (2015-2019). https://waeconline.org.ng/e-learning/Physics/physmain.html.

Wilks, S. E. (2008). Resilience amid academic stress: the moderating impact of social support among social work students. *Adv Soc Work*. *9*(2), 106–125.

Wood, D. (2020). Three branches of natural science: Physical, earth & life. https://study.com/academy/lesson/three-branches-of-natural-science-physical-earth-life.html