

Influence of School Type on Students' Test Anxiety and Performance in Biology at Senior Secondary School Level in Katsina, Nigeria

Adekunle Thomas Olutola

**Department of Educational Foundations, Faculty of Education,
Federal University, Dutsin-Ma, Katsina State, Nigeria.**
Corresponding author: Adekunle Thomas Olutola, email: olutolatola@gmail.com

Abstract

The researcher investigated the influence of school type on students' test anxiety and performance in Biology at senior secondary school level in Katsina, Nigeria. The researcher adopted a descriptive survey design. Ten senior secondary school two (SSS 2) students in Katsina town consisted of five public and five private schools were randomly chosen for the study. Data were obtained from one hundred and eighty-four senior secondary school students in Katsina town (SSS 2). Test Anxiety Questionnaire (TAQ) and Biology Performance Test (BPT) with test-retest reliability co-efficient of 0.88 and 0.87 respectively were used to obtain data for the study. The data collected were analyzed with mean and t-test statistics at 0.05 alpha level of significance. Findings revealed a significant difference between public and private school students' test anxiety in biology in Katsina ($t = -2.250$, $df = 182$, $P < .05$). Besides, there is a significant difference between public and private school students' performance in biology ($t = -4.816$, $df = 182$, $P < .05$). Based on these findings, the researchers recommended that parents of students in public and private schools stop putting much pressure on their children to do well in Biology because the higher the pressure, the higher the test anxiety.

Keywords: Biology Performance Test (PBT), parental pressure, private schools, public schools, Test Anxiety Questionnaire (TAQ)

Introduction

Science is the key to technological growth in any country and has played an important role in improving the lives of mankind through medicine, agriculture, communication, transportation, engineering and, economy. One emphasis of the Nigerian educational policy is that scientific and technological education must be acquired (FRN, 2014). In the school setting, students' performance in the science subjects has implications for the attainment of vision 20:20:20. According to Olurundare (2011), the development of any nation is usually measured by the degree and extent of socio-cultural, socio-economic, and political improvements that are brought to bear through the enterprise of science and technology. Also, Biology is one of the science subjects in senior secondary school, and it deals with the study of living things both the plants and animals (Olutola, Daramola & Bamidele, 2016).

According to Achor, Ogbeha, and Umoru (2014) described Biology as one of the science subjects offered at senior secondary school level in Nigeria, and it deals with the scientific study of living things, their relationship with one another and with the natural environment among other things. Besides, Akanji (2015) noted that the Biology science curriculum, which, is in use in Nigeria for teaching and learning in senior secondary school, had built-in the strategy where learners are required to be involved the inquiry and related activities that can develop critical thinking skills.

The different branches of Biology include Anatomy, Zoology, Bacteriology, Virology, Bryology, Histology, Malacology, Mammalogy, Arachnology, Algalogy, entomology, Paleontology, and so on (Idodo-Umeh, 2015). The status of Biology among the school subjects in general and the science subjects in particular in our secondary educational system warrant looking into the factors affecting students' performance in the subject. Many factors contributed to students' poor performance in Biology. Nwike and Catherine (2013) pointed out that the lack of effective use of appropriate instructional aid is one major problem that causes poor students' attitude in Biology.

However, teaching and learning has been associated with the school because the importance of school in the academic performance of students cannot be overemphasized. School is an institution designed for the teaching and learning process. In the school, students learn/receive lectures under the direction of teachers who serve as facilitators, and in this study, school type refers to public and private schools. In Nigeria, public schools have Federal, State, and Local government as their ownerships while private schools are owned/financed by individuals, organizations, and associations. The major aim of both public and private schools is the high academic performance of students in internal and external examinations.

Studies conducted by Okon and Archibong (2015) revealed that students in private secondary schools performed better in Social Studies than those in public schools. Also, Philias and Wanjobi (2011) reiterated that the type of schools, (single-sex, or mixed, private or public) has an effect on the academic performance of students in Mathematics. Besides, Alimi, Ehinola, and Alabi (2012) reported that there is no significant difference in the academic performance of students in public and private senior secondary schools in Ondo State. Olatoye and Agbatogun (2009) reported that there exists a significant difference in mathematics and science achievement of public and private school pupils in which private school pupils performed better than public school counterparts in mathematics and science. Besides, Olatoye (2009b) reported a significant difference between public and private school students' achievement in science.

Test anxiety is one of the factors affecting students' performance in Biology. Anxiety is an unpleasant, complex, and varied pattern of behaviour that individuals show when reacting to internal and external stimuli (Femi, 2012). Also, Segun (2011) stated that anxiety has factors that determine what pupils can do and to what extent. Research findings by Eze (2013) revealed that anxiety poses a threat to a positive character manifestation and acquisition of knowledge on either individual bases or group. At the same time, test anxiety can be defined as a feeling of uneasiness or apprehension before, during, or after a test because of,

worry or fear (Shokrpour, Zareii, Zahedi & Rafatbakhsh, 2011). It is a subjective emotional state experienced before or during a specific evaluation relating to completing the evaluation itself, the threat of failing, and perceived negative consequences (Karatas, Alci & Aydin, 2013). Porto (2013) mentioned the following as the psychological symptoms that build up in students before a test; restlessness, unusual body movements, difficulty in concentration, insomnia, fatigue, muscle contraction, abdominal pain, and tremor.

Students who have anxiety about science-standardized tests, for example, may not take science classes in high school and college and avoid careers in science (Paul, 2013). Students with test anxiety often have feelings of helplessness and powerlessness and low levels of self-worth (Abdi, Bageri, Shoghi, Goodarzi, & Hosseinzadeh, 2012). It is important to note that, anxious children can perform below their true abilities (Paul, 2013; Ramirez & Beilock, 2011). Besides, students with test anxiety may have difficulty organizing their thoughts or reading and understanding the test questions. They may do poorly on the exam even though they know the material (Amiri & Ghonsooly, 2015).

Kurbanoglu & Nefes, (2015) considered test anxiety a major cause of students' low academic achievement and negative attitudes in science education. Akanbi, (2010) and Tse & Pu, (2012) found that anxiety is negatively related to academic achievement. As anxiety increases, performance is expected to decrease (Shokrpour, Zareii, Zahedi, & Rafatbakhsh, 2011; Tse & Pu, 2012). Furthermore, Chen (2012) and Tsai and Li (2012) noted that performance could decrease when anxiety is too high or low. It is important to note that maladaptive forms of perfectionism are associated with test anxiety (Eum & Rice, 2011).

Aderinto (2000) carried out a study to investigate the relationship between anxiety and student academic performance. Ex-post facto research design was adopted for the study. A twenty-item questionnaire was used for data collection. Data collected was analyzed using Pearson product moment correlation statistical technique. Result of the findings revealed that there exists a significant relationship between test anxiety and student academic performance. However, Fulton (2016) reported that

there was a significant negative relationship between test anxiety and academic performance in standardized science test. Chukwu (2014) conducted study in Nigeria and results revealed that there was a moderate positive relationship between test anxiety and academic achievement of students in Geometry.

Faleye (2010) reported significant negative relationship between test anxiety and academic achievement. A study in Kenya by Muola, Ndirangu and Nassiuna (2009). The study revealed that there was no significant relationship between test anxiety and academic performance. In Kenya, more so in Rachuonyo South Sub County in Homa Bay County, Kenya, which is the location of this study, there has been low and declining trend in academic achievement in chemistry subject. Numerous studies which have been conducted in Kenya to find out the causes of poor performance in chemistry have pointed out factors including and not limited to Attitude of learners towards chemistry, students' self-efficacy beliefs, inappropriate learning environment, shortage or total absence of trained chemistry teachers, inadequate learning facilities (Oluoch, 2014).

Test anxiety can affect students, both behaviourally and cognitively (Murphy, 2014). Nicholson (2010) determined the effects of test anxiety on students' achievement. The data was collected from 200 eleventh grade students from a high school. These students were administered the Test Anxiety Inventory to determine the levels of test anxiety. The results of the study after analysis of data indicated that test anxiety had a significant effect on the achievement of students. Test anxiety is a psychological condition in which students experience extreme pain, worry and distress in test situation (Coon & Mittere, 20018). Though, lot of secondary school students are facing the problem of test anxiety today (Denwigwe & Obioma, 2019). This could be due to students feeling of helplessness towards their inability of finding solution to their academic challenges.

Also, according to Wicherts and Zand-Scholten (2010), inferior performances arise not because of mental problems or poor academic preparation, but because testing situations create a sense of threat for those experiencing test anxieties. This shows the need to examine the influence

of school type and test anxiety on the performance of students in Biology. Therefore, this investigated the influence of school type on students' test anxiety and performance in biology at senior secondary school level in Katsina, Nigeria.

It is worrisome and disheartening that the students' performance in May/June West African Senior Secondary School Certificate Examinations (WASSCE) general Biology in Nigeria has been poor. West African Examinations Council (WAEC, 2012) report indicated that the trend of failure rate decreased in Physics, English Language, and Mathematics, while an increased rate was recorded for Biology and Chemistry. The highest failure rate of (28.66%) was recorded for Biology followed by Mathematics (24.39%), Chemistry (22.52%), English (21.89%), and the least failure rate was in Physics (13.08%). Also, WAEC (2015) noted that the performance of candidates for Paper 2 May/June examination was poorer than that of the previous year with a raw mean score of 25 and standard deviation of 11.87 when compared with the raw mean score of 29 and the standard deviation of 12.37 of May/June 2014 West African Senior Secondary School Certificate Examinations (WASSCE).

There is a need for special attention to eliminate the students' failure rate in Biology. None of the researchers in the literature reviewed investigates the influence of school type on students' test anxiety and biology performance. This is the gap, which this study seeks to fill. Therefore, this study investigated the influence of school type on students' test anxiety and performance in biology at senior secondary school level in Katsina, Nigeria.

The main objective of the study was to investigate the influence of school type (public and private schools) on (i) students' test anxiety in Biology and (ii) students' biology performance in senior secondary schools in Katsina, Nigeria.

The researcher followed norms and standard expected in the conduct of research. Criteria for inclusion includes the participants/students must be in senior secondary school two (SSS 2), above 12 years old and indicated willingness to participate in the study.

Materials and Methods

The researchers adopted a descriptive survey research design for the study. Survey research was chosen because the researchers collected data from the respondents through a questionnaire and test. The population for the study consisted of all senior secondary school students in Katsina, Nigeria. Katsina town, Nigeria. There are twelve private and twenty-two public senior secondary schools two in Katsina town. Also, there are five-thousand nine hundred and twenty-five senior secondary school two (SSS 2) students in Katsina town at the time of the study. Katsina is the capital of Katsina State in North West Zone of Nigeria. The state is mostly Muslim, and the Hausa people with the Fulani (Hausa-Fulani) are the largest ethnic group.

The target population for the study consists of senior secondary school two (SSS 2) students in Katsina. Also, a simple random sampling technique was used to select ten (10) senior secondary schools (five public and five private schools), from the sampled schools, one hundred and eighty-four students were randomly selected to participate in the study. Researchers designed a questionnaire titled ‘Test Anxiety Questionnaire (TAQ) and Biology Performance Test (BPT)’ was used to collect data from the respondents for the study. TAQ contained 15 items with a four-point Likert-type scale of Strongly Agree (SA); Agree (A); Disagree (D), and Strongly Disagree (SD). Also, BPT consisted of 30 items multiple-choice objective test with four options for each item.

The instruments were validated by ensuring that contents and items in the instruments developed for the study were related to the independent and dependent variables. Both the content and face validity were established by the Measurement and evaluation lecturers. The test-retest reliability coefficient of 0.88 and 0.87 were obtained for TAQ and

BPT, respectively. Analysis of data was carried out using frequency, percentage, mean, and t-test statistics at 0.05 alpha level of significance.

Results and Discussion

Table 1 indicates that calculated t-value of -2.350 which is significant at 0.05 alpha level ($t=-2.350, p<0.05$). However, private school students had the highest mean test anxiety of 35.3261 than their public-school counterparts with mean test anxiety of 33.1957, which is significant at 0.05 alpha level, yet the two means are in the region of low test-anxiety.

T-test analysis was used to determine the difference between public and private students' test anxiety in biology in senior secondary schools in Katsina.

Table 1. T-test Summary Table of Public and Private Students' Test Anxiety in Biology.

School Type	N	Mean	SD	DF	Cal. value	t- value	Sig. of value	t- value	Remark
Public	92	33.1957	5.8877			-2.350	0.020		Significant
Private	92	35.3261	6.3990	182					

According to the interpretation of the scale used, the mean for the middle point on the scale is 37.5. Each of the mean in the table is below 37.5, meaning that the two means are in the region of low test-anxiety. Therefore, the null hypothesis one was rejected because there is a significant difference between public and private students' test anxiety in biology.

T-test analysis was used to determine the difference between public and private senior secondary school students' performance in biology from the sampled schools.

Table 2. T-test Summary Table of Public and Private Senior Secondary School Students' Performance in Biology.

School Type	N	Mean	SD	DF	Cal. value	t- value	Sig. of t- value	Remark
Public	92	7.7283	2.8172		-4.816	0.000		Significant
Private	92	9.9989	3.5129	182				

Table 2 reveals the calculated t-value of -4.816 which, is significant at 0.05 alpha level ($t=-4.816$, $p<0.05$). As shown in the table, private school students' had a higher mean of 9.9989 and a higher standard deviation (SD) of 3.5129 than the mean 7.7283 and standard deviation 2.8172 for the public school students. Though private school students performed significantly better than their public school counterparts, yet the achievement of students in biology is below average for both public and private schools ($t= -4.816$, $p<0.05$). Public school students scored an average of 7.7283 (25.7%) while, private school students scored 9.9983 (33.3%). The maximum obtainable score in the Biology Achievement Test is 30. These results indicate that students' from private schools performed higher than students' from public schools in Biology in Katsina, Nigeria. Therefore, null hypothesis two was rejected because there is a significant difference between public and private senior secondary school students' performance in biology in Katsina, Nigeria.

The result indicates that there is a significant difference between public and private students' test anxiety in biology. Private schools' students had higher test anxiety in biology than public senior secondary school students in Katsina, Nigeria. The finding is supported by the finding of Mousavi, Haghshenas, and Alishahi, (2008) that school type (private, public, and school for gifted students) affected the level of test anxiety. That is, school type had a significant effect on test anxiety. It is possible to infer that the high parental pressure may account for the significant difference observed on students in private schools. This may

imply that, the parents of students in private schools put much pressure on their children to do well in Biology; this, may lead to test anxiety. Test anxiety may affect the students' performance positively or negatively.

The result of hypothesis two revealed that there is a significant difference between public and private senior secondary school students' performance in biology in Katsina, Nigeria. This result indicates that students' from private schools performed higher than students' from public schools in Biology in Katsina, Nigeria. This result supported the findings of Okon and Archibong (2015) which, says that students in private secondary schools performed better in Social Studies than those in public schools. The findings disagree with the study of Alimi, Ehinola, and Alabi (2012), which reported that there is no significant difference in the academic performance of students in public and private senior secondary schools in Ondo State. Also, the result of the study agrees with the study of Philias & Wanjobi (2011), which reiterated that the type of schools (single-sex or mixed, private, or public) affects the academic performance of students in Mathematics.

The high performance of students in private schools in Biology may base on the proper monitoring of teachers in private schools by the school administrators than public schools. It may also base on the well-coordinated extra-moral Biology lesson for the students in private schools than public schools. Besides, the higher significant performance discovered in private school students in Biology than their counterparts in public schools may be because the private school students were exposed to different instructional materials during Biology class which make them perform significantly better than their counterparts in public schools where the instructional materials may not be available or inadequate.

Conclusion and Recommendations

The findings of the study establish that a significant difference exists between public and private students' test anxiety in biology. Besides, private schools' students had higher test anxiety in biology than public school students in Katsina, Nigeria. These findings tend to justify that many teachers, parents, and principals in private schools put pressure on students to do well in their academics and it can increase students' test anxiety in private schools. Also, there is a significant difference between students' performance in biology in Katsina based on school type. Students' from private schools performed higher than students' from public schools in Biology in Katsina. This finding also tends to justify the reason why parents prefer to enrol their children in private schools than in public schools.

Based on the findings of the study, the following recommendations were made: First, parents of students in public and private schools should stop putting much pressure on their children to do well in Biology because the higher the pressure, the higher the test anxiety. Next, there should be proper monitoring of Biology teachers in private and public schools by the school administrators during the teaching and learning process to improve students' performance. Besides, there should be a well-coordinated extra-moral Biology lesson for the students by Biology teachers in private and public schools. Then, the government should provide adequate and latest Biology instructional materials to both the public and private schools to enhance teaching and learning of Biology. Finally, private and public-school teachers should provide a calm and stress-free environment for Biology students during the examinations to reduce their test anxiety.

Literature Cited

- Abdi, H.M., Bageri, S., Shoghi, S., Goodarzi, S., & Hosseinzadeh, A. (2012). The role of metacognitive and self-efficacy beliefs in students' test anxiety and academic achievement. *Australian Journal of Basic and Applied Sciences*, 6, 418 – 422.
- Achor, E. E., Ogbeba, J. A. & Umoru, O. W. (2014). In search of an interactive teaching strategy that could yield high achievement in biology: An examination of computer- based instruction in some secondary schools in Nigeria. *Research Journal in Organizational Psychology and Educational Studies*, 3(1), 1-6.
- Aderinto AA. (200). Social correlates and coping measures of street-children: a comparative study of street and non-street children in south-western Nigeria. *Child Abuse & Neglect*; 24(9):1199-1213.
- Akanbi, S. T. (2010). Test anxiety as a correlate of academic achievement among senior secondary school students in Ogbomoso area of Oyo State. *African Journal of Educational Research*, 14, 89 – 97.
- Akanbi, S. T. (2013). Comparisons of test anxiety level of senior secondary school students across gender, year of study, school type, and parental educational background. *Ife PsychologIA* ; 21, 40 – 54.
- Akanji, O. A. (2015). *Enhancing teaching and learning of biology through the use of video-clips in selected senior secondary schools in Lagos*. Being a paper presented at the science teachers association of Nigeria (STAN), Lagos State Chapter held in July 2015.

- Alimi, O. S., Ehinola, G. B. and, Alabi, F. O. (2012). School types, facilities, and academic performance of students in senior secondary schools in Ondo State, Nigeria. *International Education Studies*, (5), 3. 44-48.
- Amiri, M., & Ghonsooly, B. (2015). The relationship between English learning anxiety and the students' achievement in examinations. *Journal of Language Teaching and Research*, 6, 855 – 865.
- Chen, H. (2012). The moderating effects of item order arranged by difficulty on the relationship between test anxiety and test performance. *Creative Education*, 3, 328 – 333.
- Chukwu, L.O. (2014). *Relationship among test anxiety, academic achievement and interest of senior secondary school students in Geometry in Enugu State*. Retrieved October 2016 from file:///D/%C2AO/anxietybchukwu-LINDA O.pdf.
- Coon, D. & Mittere, J. (2018). Introduction to Psychology: Gateways to mind and behavior. Mason, United States: Cengage Learning Inc
- Denwigwe, C. & Obioma, A.M. (2019). Influence of academic test anxiety on the reading comprehension of students of government secondary school Gwarinpa, Abuja, FCT. *Journal of Nigeria Society of educational Psychology (NISEP)*, 15(1), 16-28. ISSN: 1597- 2666.
- Eum, K., & Rice, K. G. (2011). Test anxiety, perfectionism, goal orientation, and academic performance. *Anxiety, Stress, & Coping*, 24(2), 167–178.
- Eze, L. (2013). Mathematics as a servant subject. *Journal of Teacher Professional Development*, 2, (3), 30-40.

- Faleye, B. A. (2010). Cognitive test anxiety and learning outcomes of selected undergraduate students. *The African Symposium: An online journal of the African Educational Research Network*, 10(2), 14-81.
- Federal Republic of Nigeria (2014). *National Policy on Education*. Lagos. Federal Government Press.
- Femi, A. O. (2012). Effects of mathematics anxiety on academic achievement of junior secondary school students in Niger State. *Journal of Mathematics Education*, 2(2), 17-28.
- Fulton, B. A. (2016). *The relationship between test anxiety and standardized test scores*. Retrieved September 2016 from <http://D:/testanxiety.USA.pdf>.
- Idodo-Umeh, G. (2015). *College biology*. Fourth Edition; Benin –City; Idodo-Umeh Publishers Limited.
- Karatas, H. Alci, B., and Aydin, H. (2013). Correlation among high school senior students' test anxiety, academic performance, and points of university entrance exam. *Educational Research and Reviews*, (8), (13), 919-926.
- Kurbanoglu, N. I., & Nefes, F. (2015). Effect of context-based questions on secondary school students' test anxiety and science attitude. *Journal of Baltic Science Education*, 14 (2), 216-226.
- Mousavi. M., Haghshenas, H and Alishahi, M.J. (2008). Effect of gender, school performance, and school type on test anxiety among Iranian adolescents. *Iranian Red Crescent Medical Journal*, 10, (1), 4-7.

Murphy, P. V. (2014). *The effect of font selection on student test anxiety*. Available from Pro-Quest Dissertations & Theses Global. Retrieved from <http://search.proquest.com/docview/1526491255?accountid=14872>

Muola, J.M., Ndirangu, G.W., Kithuka, M.R., & Nassiuna, D. K. (2009). An investigation of the relationship between test anxiety and academic performance in secondary schools in Nyeri district, Kenya. *Global Journal of Educational Research*, 8(1), 1-7.

Nicholson, A. M. (2010). *Effects of test anxiety on student achievement (ACT) for college-bound students*. Dissertation Abstracts International, 70(7), pp. 2400.

Nwike, C. M. & Catherine, O. (2013). Effects of use of instructional materials on students' cognitive achievement in agricultural science. *Journal of Educational and Social Research*. 3(5), 103-107

Okon, C. E., and Archibong, U. I. (2015). School type and students' academic performance in social studies in junior secondary certificate examination (JSCE). *Academic Journal of Interdisciplinary Studies*, (4) 2, 421-426

Olatoye, R A. & Agbatogun A. A. (2009). Parental involvement as correlates of pupils' achievement in mathematics and science in Ogun State, Nigeria. *Educational Research and Review*, 14 (10), 457-464.

Olatoye, R. A. (2009b) Students' Test Anxiety, Motivation for examinations and science achievement in junior secondary schools in Ogun state, Nigeria. *International Journal of Psychology and Counselling*, 1 (10), 194-198.

- Olorundare, A. S. (2011). *Correlates of Poor Academic Performance of Secondary Students' in the Sciences in Nigeria*. Paper Presented at Virginia State University, Petersburg, Virginia, USA.
- Oluoch, J. N. (2014). *Self-efficacy and attitude as determinants of chemistry achievement Saabruken*: LAP LAMBERT Academic Publishing. ISBN 978-3-659-54251-0.
- Olutola A. T., Daramola, D.S. and Bamidele, E.O. (2016). Comparative effects of practical and alternative to practical methods on students' academic performance in biology. *International Journal of Educational Benchmark (IJEB)*, 3(1), Pp. 67-80.
- Paul, A. M. (2013). Relax, it's only a test. *Time*, 181, 42 – 45.
- Philias, O. Y. and Wanjobi, W. C. (2011). Performance determinants of Kenya certificate of secondary education (KCSE) in mathematics of secondary schools in Nyamaiya Division, Kenya. *Asian Social Science*, 7 (2), 107-112
- Porto, A. (2013). Definitions and classification of NAWDA nursing diagnoses. *NANDA International*, 68(4), 603-609.
- Ramirez, G., & Beilock, S. L. (2011). Writing about testing worries boosts exam performance in the classroom. *Science*, 331, 211 – 213.
- Segun, E. (2011). Problem of mathematics curriculum development in Nigeria. *Journal of Nigeria Educational Researchers of Nigeria Association*, 3 (2), 50-59.
- Shokrpour, N., Zareii, E., Zahedi, S., & Rafatbakhsh, M. (2011). The impact of cognitive and metacognitive strategies on test anxiety and students' educational performance. *European Journal of Social Science*, 21, 177 – 188.

Tse, C., & Pu, X. (2012). The effectiveness of test-enhanced learning depends on trait test anxiety and working-memory capacity. *Journal of Experimental Psychology, 18*, 253 – 264.

WAEC (2012). *The Year 2012 WAEC State Committee Meeting Agenda*. Papers for Taraba State. West Africa Examination Council.

WAEC (2015). *WAEC e-Learning online*. <https://waeconline.org.ng/e-learning/Biology/Bio224ms.html>.

Wicherts, J. M. and Zand-Scholten, A. (2010). Test anxiety and the validity of cognitive tests: A confirmatory factor analysis perspective and some empirical findings. *Intelligence, 38*, 169-178.