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Students' Motivation And Test Anxiety As A Correlates Of Achievement In Senior Secondary School II Physics In Ogun State, Nigeria

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Abstract: ***The study investigated the relationship and combined influence of students' Motivation and Test Anxiety on Achievement in Senior Secondary School II Physics in Ogun State. The study adopted ex–post facto research, and data were collected in order to answer four(4) research questions. The sample comprised of three hundred and seven (307) senior secondary II Physics students (male = 166 and female = 141) drawn from population of Physics students in Ogun State. Multi stage technique was employed to randomly select eighteen schools from three Local Government Areas of the three Senatorial Districts of Ogun state, and an intact arm of SS II from each of the sampled schools was used. Three instruments adapted and validated were administered on the subjects; the resulting data were then collated and analysed using descriptive statistics (mean and standard deviation) and regression analysis.***

The finding revealed that there is positive but low significant relationship between Motivation and achievement in physics (r = +0.242, p < 0.05), negative and low significant relationship between Test Anxiety and Achievement in Physics (r = -0.264, p < 0.05). Motivation and Test anxiety accounted for 5.9% and 7.0% of the total variance in Achievement in Physics respectively. Also Motivation and Test Anxiety jointly accounted for 9.9% of the total variance in Achievement in Physics (Rsquare = 0.990, p < 0.05). These percentages are statistically significant. There is negative but low significant relationship between test anxiety and motivation (r = - 0.336, p <0.05).

Sequels to the findings, it is concluded that students will perform very well in physics when they are motivated and enough confidence is built in them to courageously face physics test or examination without anxiety or fear. It's therefore recommended that early intervention and proactive prevention programmes by the educators, schools and teachers to reduce students' test anxiety coupled with the efforts to build enough confidence in students to courageously face examination without fear will boost students' achievement in physics.

Keywords: Motivation, Test anxiety, Physics Achievement, Senior Secondary School, Ogun State, Nigeria.

I. BACKGROUND TO THE PROBLEM

There has been dramatic increase in the level of science required for intelligent citizenship. The scientific knowledge required in the workplace and in professional areas has been on the increased. In order to guarantee the production of quality in many professional areas ranging from education to health care, to technology and to engineering, it is important for all students to receive a high quality science education and learn science. Because of mathematics and other techniques involved in physics, it has been referred to as one of the difficult science subjects. There are different opinions on how to improve the learner's experience of Physics education so that it may lead to continued interest in the subject. For example, Adegoke (2011) recommended the use of multimedia instruction; Azar and Şengulec (2011) suggested the use of simulated experiments in teaching physics practical. Inspite of all these suggestions, little improvement has be made in students enrolment and achievement in physics.

Students must feel comfortable with Physics and must be challenged to achieve. Students will value physics when they see themselves capable of doing well in physics. Students who

do not see themselves capable of doing well in physics, do not value physics. The expectation of success also influence short-term strategy the students use (Dowson & Mclnerney, 2003), thereby inhibiting or augmenting achievement and leading to development of intrinsic motivation. When students do not get involved in the educational task of learning physics meaningfully, it is commonly described and conceptualized as a deficit in, or lack of, student 'motivation'. The construct of motivation has been researched from different theoretical perspectives, including the cognitive, behavioural and social learning theoretical approaches. Two types of academic motivation interrelate in most academic settings—intrinsic and extrinsic motivation. Students who are intrinsically motivated engage in academic tasks because they enjoy them. They feel that learning is important with respect to their self-images, and they seek out learning activities for the sheer joy of learning (Ryan and Deci, 2002). Extrincally motivated students tend to center on such performance goals as obtaining favorable judgments of their competence from teachers, parents, and peers or avoiding negative judgments of their competence (Ryan & Deci , 2002).

According to McDonald (2001), between two thirds of high school students appear to experience uncomfortable levels of test anxiety. Anxiety is an emotional component of human beings that manifests itself in life endeavours in form of worry and restlessness. When this kind of emotional component manifests with regard to a test or assessment condition, then it is regarded as test anxiety. Physics test anxiety is an experience which expresses itself in candidate's mind and behaviour in form of fear of failure, negative self evaluation in relation to one's previously established standard, self-blame for perceived shortcomings, social evaluation in relation to one's estimate of how others are doing and negative prediction of what will be the outcome of a physics achievement test. The level of perceived preparedness, self-efficacy, previous exposure to the course materials and test anxiety significantly predicted students' achievement in a science course (Sgoutas-Emch et al.,2007) Also, Thomas and Gadbois (2007) reported that test anxiety was a significant predictor of examination grades. Hence, it is important to find out the influence of motivation and test anxiety on students' achievement in physics. This study therefore investigated the relationship and combined influence of students' Motivation, Self-efficacy on Achievement in Senior Secondary School II Physics in Ogun State

RESEARCH QUESTIONS

- ✓ What is the relationship between students' Motivation and Achievement in Physics?
- ✓ What is the relationship between students' Test - anxiety and Achievement in Physics?
- ✓ To what extent will students' Motivation, and Test - anxiety jointly predict Achievement in Physics?
- ✓ What are the relationships among students' motivation, test-anxiety and achievement in physics?

II. METHOD

RESEARCH DESIGN

The research adopted ex-post facto procedure to collect data since the researchers have no direct control over independent variables as their manifestations have already occurred (Kerlinger & Lee, 2000).

TARGET POPULATION AND SAMPLE

The target population for this study comprised of all public and private Senior Secondary School II students in Ogun State, Nigeria. The sampling technique adopted was a multistage sampling technique. The twenty (20) local government areas in Ogun state were first stratified into the three senatorial districts. Random sampling technique was used to select a local government area from each of the three senatorial districts. The secondary schools in each of the three randomly selected local government areas were stratified into private and public secondary schools. Three public and three private school secondary schools were randomly selected from each local government areas to have a total of eighteen (18) schools. The selected arm was an intact class giving a total number of three hundred and seven (307) subjects.

INSTRUMENTATION

The following instruments were employed for the study; (i) Physics Motivation Questionnaire (ii) Physics Test Anxiety Questionnaire (iii) Physics Achievement Test (PAT). The Physics motivation questionnaire was used for measuring the students' levels of motivation towards Physics. The items were adapted by the researcher. The participants were asked to respond to a 4–point likert scale response options of strongly agree, agree, disagree and strongly disagree. There are 25 adapted items PMQ with reliability of 0.85 using Cronbach Alpha.

The Physics test anxiety questionnaire was used for measuring the students' level of Physics test anxiety. The participants were asked to respond to a 4–point likert scale response options of very true of me, true of me, slightly true of me and not at all true of me. There are 25 adapted items on PTQ with reliability of 0.89 using Cronbach Alpha

Physics Achievement Test (PAT) is a 50 multiple-choice items with four options A, B, C and D in accordance with WAEC standard. This was developed by the researcher. The content validity of PAT was ensured at the construction stage through consultation with Physics experts and the application of test blue print as stipulated by Obemeata (1999). The items was generated across the three cognitive domains (knowledge, comprehension and application) using scheme of work for Senior Secondary II Physics.

EXAMPLE OF ITEMS ON PMQ

- ✓ Understanding of Physics gives a sense of accomplishment.
- ✓ Setting challenging goals in Physics is fun

EXAMPLE OF ITEMS ON PTQ

- ✓ I worry so much before a Physics exam that I am too worn out to do my best on the exam.
- ✓ I lose focus on Physics exams, and I cannot remember topics that I knew before the exam

EXAMPLES OF ITEMS ON PAT

- ✓ The mechanical advantage (MA) of an inclined plane depend on (a) its length (b) its height (c) the products of its length and height (d)the ratio of its length to its height
- ✓ A solid weighs 45N and 15N respectively in air and water. Determine the relative density of the solid. (a) 0.33 (b) 0.50 (c) 1.50 (d) 3.00

III. DATA ANALYSIS

Data were analyzed using descriptive statistics (mean and standard deviation) and regression for research questions 1 to 4. All research questions were answered at 0.05 level of confidence using a two-tailed test.

RESEARCH QUESTION 1

What is the relationship between students' Motivation and Achievement in Physics?

	N	Range	Min.	Max.	Mean	Std. D.
Achievement in Physics	307	30.00	8.00	38.00	20.7199	5.69827
Physics Motivation	307	63.00	62.00	125.00	102.99	12.03358
Physics Test Anxiety	307	90.00	32.00	122.00	70.8176	20.66776

Table 1: Summary of the descriptive statistics of Achievement in Physics Scores

Analysis of Variance						
	Sum of Squares	Df	Mean Square	F	P	Remark
Regression	583.118	1	583.118	19.016	0.000	*
Residual	9352.791	305	30.665			
Total	9935.909	306				

*R = 0.242, R Square = 0.059, Adjusted R square = 0.056, Standard error = 5.53759, * Significant (p < 0.05).*

Table 2: Motivation as a predictor of students' Achievement in Physics

Table 1 show that the students' achievement in physics scores range from 8 to 38, in which higher scores means greater achievement in physics. The students' average performance in Physics (20.7) is below average. Students' Motivation toward Physics scores range from 62 to 125. Higher score mean that students view physics as personally useful, interesting, and important. The students' mean score is 102.99.

Table 2 show that there is a low positive correlation between motivation and students' achievement in Physics. Students' motivation accounted for 5.9% of the total variance in achievement in Physics (R square = 0.59, p < 0.05). This percentage is statistically significant. Thus, students' motivation toward Physics has a significant relationship with achievement in Physics.

RESEARCH QUESTION 2

What is the relationship between students' Test- anxiety and Achievement in Physics?

Analysis of Variance						
	Sum of Squares	Df	Mean Square	F	P	Remark
Regression	694.783	1	694.783	22.931	.000	*
Residual	9241.126	305	30.299			
Total	9935.909	306				

*R = 0.264, R Square = 0.070, Adjusted R square = 0.067, Standard error = 5.50443, * Significant (p < 0.05).*

Table 3: Test anxiety as a predictor of students' achievement in Physics

Table 1 show that the students' test anxiety score range from 32 to 122, with a mean score of 70.82. Higher score reflected greater anxiety associated with physics achievement test.

Table 3 show that there is a low negative correlation between physics test anxiety and students' achievement in Physics. Physics test anxiety accounted for 7.0% of the total variance in achievement in physics (R square = 0.070, p < 0.05). This percentage though low is also statistically significant. Thus, students' physics test anxiety has a significant relationship with achievement in Physics.

RESEARCH QUESTION 3

To what extent will students' motivation and test anxiety jointly predict achievement in Physics?

Analysis of Variance						
	Sum of Squares	Df	Mean Square	F	P	Remark
Regression	991.111	2	330.370	11.191	.000	*
Residual	8940.798	304	29.521			
Total	9931.909	306				

R = 0.310, R Square = 0.099, Adjusted R square = 0.090, Standard error = 5.43330, * Significant (p < 0.05).

Table 4: Combined influence of students' Motivation and Test anxiety on students' Achievement in Physics

Table 4 show that the combined influence of motivation and test anxiety accounted for 9.9% of the total variance in achievement in physics (R Square = 0.099, p < 0.05). This percentage is significant. These two independent variables are therefore important predictors of achievement in Physics.

RESEARCH QUESTION 4

What are the relationships among students' motivation, test-anxiety and achievement in physics?

	Physics achievement	Physics Motivation	Physics Test Anxiety
Physics achievement	1.000	.242	-.264
Physics Motivation	.242	1.000	-.336
Physics Test Anxiety	-.264	-.336	1.000

Significant (p < 0.05), N = 307

Table 5: Correlation matrix

Table 5 show that there is low negative but significant relationship between test anxiety and motivation ($r = -0.336$, $p < 0.05$), test anxiety and students' achievement in physics ($r = -0.264$, $p < 0.05$), but positive and significant relationship between physics motivation and achievement in physics ($r = 0.242$, $p < 0.05$). Thus the higher the student test anxiety, the lower the motivation towards physics resulting in poor physics achievement. The lower the student test anxiety, the higher motivation towards physics resulting in better achievement in physics. However, the more students are motivated towards physics, the achievement in physics.

IV. DISCUSSION

The result revealed that there is significant relationship between motivation and students' cognitive achievement in Physics. In other words, it implies that students with high Motivation also have high achievement in Physics. This finding agrees agrees with the findings of Broussard and Garrison (2004) who also found that there were significant relationships between academic performances and motivation but contrary with the finding of Onuka and Durowoju (2010), that motivation has no significant relationship with students' achievement in Junior Secondary School Business Studies. According to the results of the study, there was a low but negative correlation between students' Physics Test anxiety and their Achievement in Physics. This finding support previous research indicating that test anxiety interferes with students' achievement (Yildirim, & Ergene, 2003; Yildirim, Genctanirim, Yalcin, & Baydan, 2008). The higher the student test anxiety, the lower the achievement in Physics. Findings from this study also show that test anxiety has negative significant relationship with motivation for examinations. This implies that the higher the test anxiety the lower the motivation for physics. If students are well motivated for examinations, test anxiety will be reduced.

V. RECOMMENDATION

It's recommended that early intervention and proactive prevention programmes by the educators, schools and teachers to reduce students' test anxiety coupled with the efforts to build enough confidence in students to courageously face examination without fear will boost students' achievement in physics.

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