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Effect of Motivational Models on Secondary School Students Achievement in Physics in Makurdi Local Government Area of Benue State

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Abstract
This study was conducted to examine the Effect of motivational Models on Secondary School Students, Achievement in Physics in Makurdi Local Government Area of Benue state. It explicitly focused on extrinsic and intrinsic motivation in relation to students' performance in physics. A quasi-experimental research design was employed for the study, pre and post-Teacher Made Physics Achievement Test-TEMPAT was developed by the researcher and administered to a sample of 150 senior secondary school students in senior secondary class two (SS2). These students were drawn randomly from five different secondary schools in Makurdi Local Government of Benue State. Mean and standard deviation were used to answer the research questions. The data obtained were analyzed using t-test with a 0.05 level of significant, from the t-test analysis the results all showed a p-value of 0.0001, since the p-value is far lesser than the level of significant (p-value<<0.05), it revealed that the performance of students taught using intrinsic and extrinsic motivation was far better than those taught without any motivation. The results also indicated that there is no significant difference between the performance of male students to that of the female students, since both p-values (0.91 & 0.86) for intrinsic and extrinsic motivation are greater than the level of significant (p-values>0.05). As a result of this, the study recommends that physics lessons at secondary school level should be well planned in a creative way that motivational techniques such as praise, rewards, classroom activities, goal setting skills are use in delivering the lessons and that Government, school administrators and parents should ensure that competitions among students and guidance and counselling programs are encouraged, as it increases motivation of students.

1. Introduction

Science is the gateway to modern day technological advancement, it is one of the most important subject(s) taught in the secondary schools and beyond. It can be traced back to early man who used stones to ignite fire; he had made use of scientific method to determine the development which leads to the discovery of new ideas. Nowadays, countries all over the world, especially the developing ones like Nigeria are striving hard to develop technologically and scientifically, since the world is turning scientific and all proper functioning of lives depend greatly on science. Science has been regarded as the bedrock on which modern day technological breakthrough is built (Oladejo, Olosunde, Ojebisi & Isola, 2011). Science comprises of basic disciplines such as physics, chemistry, mathematics and biology.

The 2005 review done by Esiobu indicated that many investigations have shown that secondary school students exhibit dwindling interest in science (as cited in Oladejo et al. 2011). Moreover, physics as one of the science subjects remains one of the most difficult subjects in the school curriculum according to the Nigeria educational research and development council (NERDC) (Isola, 2010). According to Ibeh, Onah, Umahi, Ugwuonah, Nnachi & Ekpe, (2013), physics is a fulcrum subject among the sciences that requires special attention. This is because information technology, which has reduced the world into a global villages through use of satellites and computers, the use of principles of physics has been very useful. A wide range of application of physics is used in industrial development for the improvement of materials useful to the wellbeing of human race. Since physics is the study of matter and energy and how they affect each other (Adeyemo, 2011). In the entertainment industry physics has contributed to the refinement of sound which is a form of energy and color mixing to create special effects in stage presentations. The study of physics involves the pursuit of truth, hence it inculcates intellectual honesty, diligence, perseverance and observation in the learners. Despite the importance of physics in the development of science and technology, physics remains the least favored science subjects among students generally. This is because very few students choose to study science and physics in particular at O-level and subsequently, at higher levels of learning.

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In Nigeria today, some of the reasons mentioned by Erinosho (2013), to be responsible for poor learning in physics includes students poor attitude towards physics, lack of motivation, poorly resourced ability and poor teaching method. Motivation is significant to arouse students' interest towards learning process in every teaching learning situation. In teaching learning process with the help of motivation, the teacher can maintain, control, and arouse interest of the learners. Motivation can be classified into intrinsic motivation and extrinsic motivation (Abbas and Khurshid, 2013). Intrinsic motivation is the pleasure and interest in activities that exist within an individual, whereas, extrinsic motivation is the desire or interest in activities for the purpose of rewards. In school settings, teachers use positive and negative reinforcement to motivate students, examples of positive reinforcement are praise, group activities grades, whereas negative reinforcement involves punishments. As we all know, everyone needs motivation from time to time for better performance, be you a government staff, a classroom teacher or a student, this motivation can be inform of incentives such as allowances and take home packages during festive period for staff, and for students, praise or good remarks. The study is therefore significant as it provides solutions to teachers and educators in their efforts to improve student's achievement through aspect of motivation.

This study investigated on the effect of motivational models on secondary school students' achievement in physics by analyzing their performance in pre-test and post-test administered to the students. In the study the following research questions were investigated:

i. What are the mean physics achievement test scores and standard deviation of physics students for intrinsic motivational model?
ii. What are the mean physics achievement test scores and standard deviation of physics students for extrinsic motivational model?
iii. What are the mean physics achievement test scores and standard deviation for male and female physics students in intrinsic and extrinsic motivational model?

The following research hypothesis were formulated for this study and was tested at 0.05 level of significance.

I. There is no significant difference between the mean and standard deviation of the pre-TEMPAT and post-TEMPAT for intrinsic motivational model.

II. There is no significant difference between the mean and standard deviation of the pre-TEMPAT and post-TEMPAT for extrinsic motivational model.

III. There is no significant difference between the mean and Standard deviation of the male and female physics students taught using intrinsic and extrinsic motivational models.

2.Methodology

This study employed a quasi-experimental design. Five senior secondary schools were randomly selected from Makurdi local government area of benue state, Nigeria. The sample for the study consisted of 30 students of senior secondary class two (SS2) from each of the selected schools, making a total of one hundred and fifty (150) senior secondary class two (SS2) Physics students, these classes will be divided into two groups through balloting, representing the classes for intrinsic and extrinsic motivation model.

2.1 Instruments

Teacher made physics achievement test (TEMPAT) was used for the collection of data for this study. It was designed in form of a pre-test and a post-test. The pre-TEMPAT was developed based what students have studied and the post-TEMPAT was developed based on selected topics taught by the researcher, the topics includes; heat energy, measurement of heat energy, reflection of light waves . The pre and post-TEMPAT consisted of fifteen (15) multiple choice questions. Some of which were adapted from the Senior School Certificate Examination (SSCE) conducted by the West African Examinations Council (WAEC). The researchers developed the questions based on the content of topics that used in the investigation. The objectives of the topics, stated in Physics Curriculum (NERDC-Nigerian Educational Research and Development Council) served as a guide for developing the questions.

2.2 Data Collection and Analysis

Two treatment groups were used for in the experiment. Pre-test was administered to both the treatment groups. At the end of the treatment session, post-test was administered to the groups. Data was then collected and analyzed using mean and standard deviation for the research questions while Student t-test was used to test the hypotheses at 0.05 level of significant.

3.Results

The results of the analysis of the data obtained for each of the research questions and research hypothesis are presented as follows:

3.1 Research question one

What are the mean physics achievement test scores and standard deviation of physics students for intrinsic motivational model?

Table 1: mean score ($\bar{X}$) and standard deviation (SD) of physics students for intrinsic motivation.

Intrinsic	n	($\bar{X}$)	(SD)
Pre-TEMPAT	75	6.93	2.26
Post-TEMPAT	75	10.51	2.43

Table 1 above shows that the mean score for intrinsic motivational model in the pre-test was 6.93 while that of the post-test after intrinsic motivation have been administered was 10.51. Therefore, the performance of students after being motivated intrinsically yielded better results than when they were not motivated.

3.2 Research question two

What are the mean physics achievement test scores and standard deviation of physics students for extrinsic motivational model?

Table 2: Mean score ($\bar{X}$) and standard deviation (SD) of physics students for extrinsic motivational model.

Extrinsic	n	($\bar{X}$)	(SD)
Pre-TEMPAT	75	7.09	2.36
Post-TEMPAT	75	11.49	2.89

Table 2 above shows that the mean score for extrinsic motivational model in the pre-test was found to be 7.09 while that of the post-test after being motivated extrinsically was 11.49. This implies that the performance of students after the administration of extrinsic motivation was better than the initial state when no motivation was involved.

3.3 Research question three

What are the mean physics achievement test scores and standard deviation for male and female physics students in intrinsic and extrinsic motivational models?

Table 3: Mean score ($\bar{X}$) and standard deviation (SD) of male and female physics students taught using intrinsic and extrinsic motivational models in post-teacher made physics achievement test (post-TEMPAT).

Variable	n	($\bar{X}$) Intrinsic	($\bar{X}$) Extrinsic	(SD) Intrinsic	(SD) Extrinsic
Male	74	10.47	11.55	2.05	3.28
Female	76	10.54	11.42	2.70	2.35

Table 3 above shows that the number of female students is greater than that of the male and the mean score of female for intrinsic motivational model is 10.54 while that of the male for intrinsic motivational model is 10.47. This shows that there is no much difference in the performance of female to that of the male since the slight difference in their mean is due to the higher number of female to male.

On the other hand the mean score of female for extrinsic motivational model is 11.55 while that of the male is 11.42. Showing that we have yet another slight but insignificant difference in their mean, which again is due to the small difference in number of female to male, therefore, no significant difference in the performance of female to male for extrinsic motivational model.

3.4 Research hypothesis one

There is no significant difference between the mean and standard deviation of the pre-TEMPAT and post-TEMPAT for intrinsic motivational model.

Table 4: t-test of the pre-TEMPAT and post-TEMPAT for intrinsic motivational model.

Intrinsic	Mean	n	D.F	T-cal	P-value
Pre-TEMPAT	6.93	75	148	9.33	0.0001
Post-TEMPAT	10.51	75			

Table 4 reveals that the calculated p-value is far lesser than the 0.05 level of significance. Decision rule states that "Reject null hypothesis, H_o in favour of alternative hypothesis if the p-value calculated is lesser than the level of significance, otherwise, do not reject". Applying the rule to table 4, we reject the null hypothesis H_o1 since p-value calculated (0.0001) is far lesser than the 0.05 level of significance. It therefore means that there is significant difference in the performance of students when they were not motivated intrinsically and when they have been motivated intrinsically.

3.5 Research hypothesis two

There is no significant difference between the mean and standard deviation of the pre-TEMPAT and post-TEMPAT for extrinsic motivational model.

Table 5: t-test of the pre-TEMPAT and post-TEMPAT for extrinsic motivational model.

Extrinsic	Mean	n	D.F	T-cal	P-value
Pre-TEMPAT	7.09	75	148	10.23	0.0001
Post-TEMPAT	11.49	75			

Table 5 shows that with the degree of freedom of 148 at 0.05 level of significance, the p-value calculated is far lesser than the level of significance, i.e. 0.0001<0.05. Consequently, the null hypothesis (H_o2) is rejected and its alternative is accepted. Hence, it can be deduced that there is a significant difference in the performance of students when motivated extrinsically and when not motivated extrinsically. Extrinsic motivational model therefore, enhanced performance significantly.

3.6 Research hypothesis three

There is no significant difference between the mean and Standard deviation of the male and female physics students taught using intrinsic and extrinsic motivational models.

Table 6: t-test of male and female for intrinsic motivational model.

Intrinsic	Mean	n	D.F	T-cal	P-value
Male	10.47	32	73	0.12	0.91
Female	10.54	43			

Table 7: t-test of male and female for extrinsic motivational model.

Extrinsic	Mean	n	D.F	T-cal	P-value
Male	11.55	42	73	0.18	0.86
Female	11.42	33			

The post-test results of male and female students motivated intrinsically presented by table 6 above yielded calculated p-value of 0.92. Since p-value calculated is greater than 0.05 level of significant, the null hypothesis (Ho3) is not rejected but accepted. Thus, there is no significant difference between the performance of male and female students motivated intrinsically.

Similarly post-test results of male and female students motivated extrinsically presented by table 7 above indicates a calculated p-value of 0.86 which is greater than the 0.05 level of significance, therefore the null hypothesis (Ho3) is yet again accepted. Meaning, there is no significant difference between the performance of male and female students motivated extrinsically.

4. Conclusions

From the findings, it is clear that the use of intrinsic and extrinsic motivation enhanced the teaching-learning process of Physics. This was evident in the statistically significant difference in the performance of students taught using intrinsic and extrinsic motivational models and when taught without either of the motivational models in the Teacher Made Physics Achievement Tests. Since there was no significant difference in the performance of male and female students taught using either intrinsic or extrinsic motivational models, we conclude that the use of intrinsic and extrinsic motivational models in the teaching of Physics is gender independent.

References

[1]. M Abbas, F Khurshid. Motivational Techniques and Learners Academic Achievement at Primary Level, Global Journal of Human Social Science Linguistics and Education,10th edition 13(3), 2013, 15-24

[2]. SA Adeyemo. The Effect of Teachers Perception and Students Perceptionof Physics Classroom Learning Environment on Their Academic Achievement in Senior Secondary Schools Physics, International Journal of Educational Research and Technology, 2(1), 2011, 74-81.

[3]. SY Erinosho. How Do Students Perceive The Difficulty of Physics in Secondary School? An Exploratory Study in Nigeria, International Journal for Cross-Disciplinary Subjects in Education (IJCDSE), Special Issue, 3(3), 2013, 1511-1546.

[4]. GO Esiobu. Genre Issues In Science and Technology Education Development. In: Science and Technology Education for Development, Uwowi, U.M.O. (Ed.). NERDCPress, Lagos, 2005, 137-156.

[5]. GF Ibeh, DU Onah, AE Umahi, FC Ugwuonah, NO Nnachi, JE Ekpe. Strategies to Improve Attitude of Secondary School Students Towards Physics for Sustainable Technological Development in Abakaliki L.G.A, Ebonyi, Nigeria, Journal Of Sustainable Development Studies, 3(2), 2013, 127-135.

[6]. OM Isola. Effects of Standardized and Improvised Instructional Materials on Students, Academic Achievements in Seconadry School Physics. M.Ed Thesis, University of Ibadan, Ibadan, 2010.

[7]. MA Oladejo, GR Olosunde, AO Ojebisi, OM Isola. Instructional Materials and Students, Academic Achievement in Physics: Some Policy Implications, European Journal of Humanities and Social Science, 2(1), 2011, 2220-9424.