



Influence Of Scientific Attitudes On Students Academic Achievement Performance In Physics In Ernakulum District

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ABSTRACT

The aim of this study was to find out the influence of scientific attitudes on student's academic performance in physics in some selected secondary schools in Ernakulum District. Four research objective, questions and hypothesis were formulated to guide the study. The research undertook survey design with a population of one thousand (1000) and sample size of two hundred (200) SS2 physics students from ten (10) secondary schools. The first hypothesis was tested using Pearson's product moment correlation analysis, the second hypothesis was tested with one-way ANOVA, the third and fourth hypotheses were tested using the independent t-test analytical techniques. The first, second and fourth hypotheses were significant which implies that student's scientific attitude, teacher's academic qualification and school location have negative influence on the academic performance of students in physics, while the third hypothesis was not significant, this also implies that gender difference is not a determine factor in academic performance in physics. It was therefore concluded and recommended that; students should be exposed to the relevance of science of the junior level of education, qualified teachers should be employed to teach physics in both rural and urban schools, quality teachers facilities and other necessary academic infrastructures should be the same in both urban and rural schools, educational needs should be provided equally for both males and females and government should as well provide relevant policies that would ensure that academic achievement in both rural and urban setup are equally enhanced.

Key words: scientific attitudes, physics, teachers, students, rural and urban.

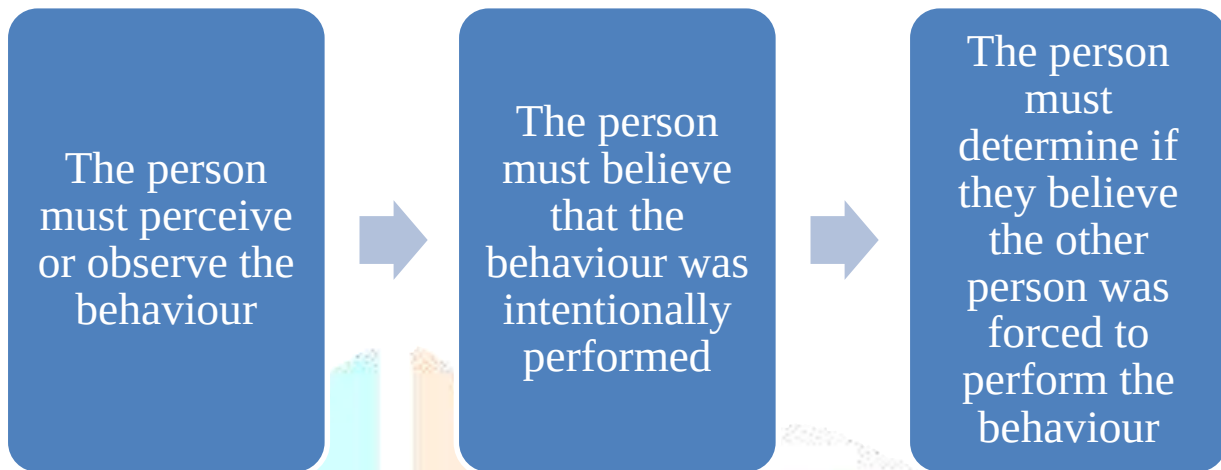
THEORITICAL FRAMEWORK

These theories are supported by the following

1. Attribution theory by Bernard Weiner (1974)
2. Theory of constructivism by Jean Piaget

Attribution theory by Bernard Weiner (1974)

Attribution theory is concerned with how individuals interpret events and how this relates to their thinking and behaviour. Weiner developed a theoretical framework that has become a major research paradigm of social psychology. Attribution theory assumes that people try to determine why people do what they do, either attribute cause to behaviour. A person seeking to understand why another person did something may attribute one or more causes to that behaviour a three stage process underlie all attribution;



Weiner (1974), focused his attribution theory on achievement, he identified ability, effort task, difficulty and luck as the most important factors affecting attribution for achievement. Attribution are classified along three casual dimensions; locus of control, stability and controllability. The locus of control dimension has two poles; internal versus external locus of control. The stability dimension captured whether causes change over time or not. For instance, ability can be classified as a stable, internal causes and effort is classified as unstable and internal. Controllability contrasts causes one can control such as skill/efficiency, from causes one cannot control such as aptitude, mood, other's actions and luck.

Relevance of Bernard Weiner's theory of attribution to this study

According to Bernard Weiner attribution theory, high achievers will approach rather than avoid task relating to succeeding because of their confidence of failure is thought to be caused by bad luck or poor exam, either not their fault. Thus, failure does not affect their self-esteem but success builds pride and confidence. On the other hand, low achievers avoid success related chores because they tend to; doubt their ability and or assume success is related to luck or who you know or to other factors beyond their control. Weiner held the following beliefs regarding learning and education:

1. That there is a strong relationship between attitude and achievement.
2. That people's behaviour is attributed to internal and external causes that influence human behaviour, explaining the theory further, (Wikipedia, 2011) maintain that over view of the world, our previous experiences with a particular person or situation and our knowledge of behaviour play an important role in our attempt to explain the world and to determine the causes of an event or behaviour.
3. That students with higher rating of themselves and with higher school achievement tend to contribute success to internal, stable, uncontrollable factors such as ability, while they attribute failure to either internal, unstable, controllable factors such as efforts or external uncontrollable factors such as task difficulty.
4. Weiner emphasized the facts that student's disposition or attitude (internal factors) can cause poor academic performance in Physics.

Theory of Constructivism by Jean Piaget (1935)

Theory of constructivism which was propounded by Jean Piaget States that people construct their own understanding and knowledge of different things through experiencing things and reflecting on those experience, constructivism learning theory by Jean Piaget generally explains that; when a person or learner encounters with something new, first they have to reconcile it either their previous ideas and experiences, maybe to change what they were believed or maybe discarding the new information as irrelevant. In his words, people are the active creators of their own knowledge. Piaget elaborate about nine (9) principles that guide constructivism learning theory such as; learning is an active process whereby learners use sensory input and construct meaning out of it, the crucial action of constructing meaning in mental (cognitive) hence, it happens in the mind, and people learn to learn as they learn. Other principles include learning is a social activity so learning is intimately associated with learner's interaction with other human beings and environment around him, learning uses language hence, the language used influence learning is contextual people learn in relation to what is known, believe and observable. The remaining principles of constructivism are; it takes time to learn because learning is not instantaneous, one needs knowledge to learn and motivation is a key component in learning.

Piaget (1935) suggested that knowledge is internalized through accommodation and ideas from their experiences. Constructivism views learning as a process in which student's activity construct or build new ideas or concepts base upon prior knowledge and new information. And all these processes elaborated by the theory are required for effective teaching and learning and teaching of science subjects since learning and teaching of science require practical experiment, observation and retention, so the learning theory of constructivism comply with teaching and learning of science and the performance either good or poor performance is determine by the whole processes of teaching.(Ekpen,2020)

Relevance of Jean Piaget theory of constructivism to this study

The theory of constructivism by Jean Piaget has relevance to this study because the theory is particularly applicable to the teaching and learning of various things including science subjects (Physics). A performance is an outcome of learning hence; ways of learning determine outcome or performance. The academic performance in science subject (Physics) is an outcome of how the subjects were learnt. The process of teaching and learning science subjects involve asking of questions, experiment, observation, exploration, and assessment and all those activities are elaborated as main principles of constructivism learning theory. It shows its basic assumption that learning is constructing of ideas, knowledge and understanding through experience, observation and reflection and there are independent variables which are the influencing factors in the process of learning Physics and have relation to independent variable which is academic performance in grades.

The purpose of the study

The purpose of the study was to investigate the influence of scientific attitude on student's academic performance in Physics in Enakulum district.

The objective of the study

The objectives of the study were;

1. To investigate the relationship between students scientific attitude towards Physics and academic performance in Physics.
2. To investigate the relationship between teachers qualification and academic performance in Physics.
3. To investigate the relationship between students gender difference and academic performance in Physics
4. To determine the extent to which the school location influence the academic performance of students in Physics.

Statement of hypothesis

The following statements of hypothesis were formulated to guide this study;

1. There is no significant relationship between student's scientific attitude towards Physics and academic performance in Physics.
2. Teacher's academic qualification does not significantly relate to academic performance of students in Physics.
3. There is no significant relationship between student's gender difference and academic performance of students in Physics.
4. There is no significant relationship between school location and students' academic performance in Physics.

Significance of the study

The result of the study is hope to;

1. Assist the students to improve their scientific attitude towards Physics, it will also help to improve student's interests towards school programs particularly the subject, thereby improving their academic performance.
2. The study will be of great help to the teachers to develop new learning experiences for the students also to improve in their method of teaching Physics, hence, improving the performance of students in Physics.
3. The study will help the parent to give adequate support to their wards as this will inspire them to pay special attention to the learning of Physics.
4. The study may help the government as they need empirical data to determine academic performance of students in Physics.
5. To curriculum planners and education administrators, this study will provide the empirical data on the overall performance of secondary school students in Physics to facilitate proper curriculum policies and program and effective recording of data.
6. To researchers, this study will be of help to other researchers in the related field.

Limitations of the study

The problems encountered during the course of this study include:

1. During the administration of the instrument in the sample schools, it was of high differences as principals were complaining of taking the time of their classes for instrument administration.
2. Cause for materials pertaining this research topic was really difficult.
3. The time for the research was short/limited as the researcher carried out the research alongside his academic activities.
4. In spite of all these, the instrument was administered and research was carried out successfully.

Delimitation of the study

The study was limited to both public and private secondary schools in Ernakulam district. The study was also limited to the students in senior secondary school two (SS2). The study was strictly concern with the influence of scientific attitude towards Physics and academic performance in Physics.

Definition of terms

Physics:

It is the scientific study of matter, its structure, composition, properties and the change it undergoes (Wikipedia, 2014).

Academic performance:

It is define as the observable or measurable behaviour of a person, an animal in a particular experimental situation (Simson and Weiner, 1989).

Scientific attitude:

It is a way of viewing things, a curiosity to know how and why things happen, with an open mind and governed by facts (Oskamp and Schultz, 2015).

Sample of the Study

The sample for the study comprised of two hundred (200) students selected from a total population of one thousand (1000) SS2 students in both rural and urban schools in Ernakulam district. A further breakdown of the sample procedure is shown in the table below;

Procedure for Data Analysis

In this section, the hypothesis is first stated, the independent and dependent variables identified and the statistical tools used for data analysis stated.

Hypothesis One

There is no significant relationship between student's scientific attitude towards physics and academic performance in physics.

Independent variable: scientific attitude. Dependent variable: Academic Performance. Statistical tool used: Pearson product moment correlation analysis.

Hypothesis two

Teacher's academic qualification does not significantly relate to the academic performance of students in physics. Independent variable: teacher's academic qualification. Dependent variable: academic performance. Statistical tool used: one way ANOVA

Hypothesis three

There is no significant relationship between student's gender difference and academic performance in physics. Independent variable: gender difference.

Dependent variable: academic performance. Statistical tool used: independent t-test analysis. Hypothesis four

There is no significant relationship between school location and academic performance in physics.

Independent variable: school location Dependent variable: academic performance. Statistical tool used: independent t-test analysis.

Hypothesis one

This hypothesis posited that there is no significant relationship between student's scientific attitude and academic performance in physics.

Table two: Pearson's product moment correlation statistical analysis of relationship between students scientific attitude and academic performance of physics students (N=200).

Variable type	$\sum X$	$\sum X^2$	$\sum XY$	r-cal
	$\sum Y$	$\sum Y^2$		
Scientific attitude	5220	10494	9750.9	0.8517
Academic performance	5021	12490.795		

*Sig at 0.05, df = 198, r-cal = 0.159

This result was significant as the calculated value of 0.8517 was greater than critical value of 0.159 at 0.05 level of significance with 198 degree of freedom. The null hypothesis was therefore rejected. This implies that there was a significant relationship between student's scientific attitude towards physics and academic performance of physics students.

Table three

One-way ANOVA of relationship between teacher's academic qualification and academic performance of students in physics

	Treatment Descriptive statistics				
	1Name	2name	3name	4name	Total
N	54	16	68	44	182
$\sum X$	1034	289	2106	1370	4799
N	19.1481	18.0625	30.9706	31.1364	26.368
$\sum X^2$	21412	5481	66412	43.586	136891
S.D	5.6164	4.1708	4.208	4.6485	7.562

Source	Result details		Df	MS	
	SS				
Between Treatment	6359.4599		3	2119.82	F94.547
Within treatment	3990.8753		178	22.4206	
Total	10350.3352		181		

The f-ratio value is 94.54767, f-critical =3.91 the result is sig. at $p < 0.05$

Descriptive statistics in table three revealed that the high mean was for teachers with high academic qualification (31.1364). Analysis of variance (ANOVA) in that same table 4 was used to find out if the observed difference in the descriptive statistic was statistically significant. The ANOVA result showed an f-value of 94.54767. The p-value was 0.00001, since the f-value was greater than the p-value, ($94.54767 < 0.00001$) at 0.05 level of significant, the result was significant. The null hypothesis was therefore rejected. This means that academic qualification of teachers has a significant relationship with the academic performance of students in physics.

Hypothesis three

This hypothesis stated that there is no significant relationship between student's gender difference and academic performance of students in physics

Table four: Independent t-test analysis of relationship between student's gender difference and academic performance in physics.

Gender	N	X	SD	t-cal
Male	121	24.75	8.29	4.56
Female	119	25.65	7.34	

*Sig at 0.05 level, df = 198, t-value = 0.7789 p-value= 0.6789

This result was statistically significant as there was no significant difference in critical t- value of 0.7789 and p-value of 0.6789 at 0.05 significant levels with 198 degree of freedom. The null hypothesis that states that there is no significant relationship between student's gender difference and academic performance of students in physics was accepted.

Table five: Independent t-test analysis of relationship between school location and academic performance in physics.

Gender	N	X	SD	t-cal
Urban	113	18.24000	5.81100	
Rural	87	4.56400	30.39000	

* Sig at 0.05 level, df = 198, critical t-value = 4.1374 p-value= 0.0001

Descriptive statistic in table six revealed that the highest mean was for schools located at the urban setting (18.24000). The table also showed that the result is statistically significant as the critical t-value of 4.1374 was greater than the p-value of 0.0001 at 0.05 significant levels with 198 degree of freedom. Therefore the null hypothesis that states that there is no significant relationship between school location and academic performance of students in physics was rejected.

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