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Research Paper EDUCATION

A Study On Attitude Of High School Students Towards Physics Lessons And Physical Experiments

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ABSTRACT

A study on attitude of high school students towards physics lessons and physical experiments has been dealt with in this paper. The sample included 300 students studying different high schools in Bangalore distict selected by using random sampling technique, the questionnaire developed by Barmby et al. (2005) to question attitudes towards physics lessons and physical experiments of the students to be used for data collection. t-test' technique was adopted for data analysis. The Girls students are better than Boys students, urban students are better than rural students, 10th standard students are better than 8th standard students, Aided school students are better than Government students, unaided school students are better than Government students and Aided school students are better than unaided students and kannada medium students are better than English medium students in attitudes towards physics lessons and physical experiments.

KEYWORDS: High School, Physics Education, Physical Experiments, Attitude

Introduction

Science has been playing an important role in our lives and hence become integral parts of our social and cultural life. As a science, Physics plays an important role in explaining the events that occur in the universe. In all events that around us can be found physical laws and principles. The developments in physics in the 20th century, it has been extremely successful in that it also greatly benefited to the other basic and applied sciences from these developments (Fishbein 1975). Although physics is in every area in our life and facilitate our lives, national and international studies show that success in physics education is lower than other disciplines (Gok and Silay 2008; Dieck 1997; Rivard and Straw 2000, Mattern and Schau, 2002).

In physics education, various methods and techniques can be used according to the content. Laboratory methods, which are the mostly used method that provides permanent learning, is an educational method encouraging mental activities and allowing students to work individually or in groups (Staeck 1995). Laboratory methods ensure that students learn ways to use the knowledge with this method rather than memorising it. Students improve their skills to better understand of concepts, and adapt them to daily life as well as their personal skills, and it provides a positive attitude towards physics lessons (Algan 1999, Staeck 1995).

Physics education is in a continual evolving together with the changing world conditions. Therefore, creation of new learning media in the continuously improving educational programs and determining of the students towards physics lessons and physical experiments in a selection of learning materials and methods are essential for effective learning of the lectures. Attitudes are related to coping with and management of the emotions.

Review of related literature:

According to Hendrickson, attitudes are the best predictor for estimation of students' success Activities must be planned, organized and implemented so that students may develop more positive attitudes. (Pintrich, 1996). Many attitude scales have been developed for the determination of students' attitudes towards Natural Sciences. Regarding these scales, Hewitt (1990), Oliver and Simpson (1988), House and Prison (1998), Geban et all. (1994), Kind et al. (2007) Pell and Jarvis (2001), Reid and Skrybina (2002), Selvi (1996), Bilgin et al. (2006), Nuhoğlu (2004,2008), Bozdoğan and Yalçın (2005) have developed attitude scales toward physics lessons, physics laboratories, and science lessons Budak (2001) has developed an attitude scale toward chemistry laboratory; Ekici (2002) has developed an attitude scale toward biology laboratory; and ġimÇek (2002), Kan and AkbaĞ (2005) have developed an attitude scale toward chemistry lessons. Researchers mostly examined attitudes of primary and high school students or candidate teachers, or investigated to the relationship between students' attitude and their success.

Objectives of the study:

The following objectives were framed for the present study

1. To study the attitude of Boys and girls students' towards physics lesson and physics experiments.
2. To study the attitude of Urban and Rural students towards physics lesson and physics experiments.
3. To study the attitude of 8th, 9th and 10th standard students towards physics lesson and physics experiments.
4. To study the attitude of Government, aided and unaided school students towards physics lesson and physics experiments.
5. To study the attitude of Kannada and English medium students towards physics lesson and physics experiments.

Hypotheses

In pursuance of the objectives 1- 5 following Null Hypotheses were set up.

1. There is no significant difference between Boys and girls students attitude towards physics lesson and physics experiments.
2. There is no significant difference between Urban and Rural students attitude towards physics lesson and physics experiments.
3. There is no significant difference between 8th, 9th and 10th standard attitude towards physics lesson and physics experiments.
4. There is no significant difference between Government, aided and unaided school students attitude towards physics lesson and physics experiments.
5. There is no significant difference between Kannada and English medium students attitude towards physics lesson and physics experiments.

Sample of the study:

Sample is a true representative of the population. In the present study researcher has used the random sampling technique for drawing the sample. The sample consisted of 300 high school students studying in different High schools in Bangalore District. The basis of was Gender (120- male and 180 -female), Location (180 -urban and 120- rural), Class (8th -85, 9th-90 and 10th -125), type of schools (100 –Government, 100 -aided and 100 -Unaided) and Medium of instruction (140- kannada and 160- English)

Tool Used For Collection of Data

The tool used for collection of data is: The questionnaire developed by Barmby et al. (2005) to question attitudes towards physics lessons and physical experiments of the students was decided to be used. The test has the content validity as it is developed by taking the opinion of experts. The content validity is determined by expert's judgment. The experts in the area covered by the test were asked to assess its content validity. The experts carefully reviewed the process used in developing the test as well as the test and ensured the content validity of the test. Reliability of the questionnaire was checked at this stage. Reliability factor of the applied scale regarding the sampling area came out to be as Cronbach's Alpha =0.73. The questionnaire is consisting 20 items in total, 12 items are about the students' attitude towards physics lessons and 8 items about the students' attitude towards physical experiments.

Statistical Technique Used

't' – Test

t- test was used to find the significant difference in the attitudes towards physics lessons and physical experiments scores high school students with reference to gender, location, Class, types of school and medium of instruction . The obtained t-value was referred to t-distribution table for the appropriate degrees of freedom at 0.01 and 0.05 levels of significance.

Major findings

Table-01 The difference in the attitudes towards physics lessons and physical experiments scores high school students with reference to gender.

	Variable	N	Mean	SD	t-value	p-value	sign
Gender	Girls	180	31.14	4.116	2.051	< 0.05	S*
	Boys	120	30.16	4.025			

(*- Significant at 0.05 level of significance)

The above table- 01revels that the obtained t-value in the attitudes towards physics lessons and physical experiments of gender scores level is more than the tabled values (1.96) at 0.05 levels of significance. Therefore the null hypothesis in this regard is rejected. It means that the obtained t-values are found to be significant. Therefore it is concluded that the Girls students are better than Boys students in attitudes towards physics lessons and physical experiments.

Table-02 The difference in the attitudes towards physics lessons and physical experiments scores high school students with reference to location,

	Variable	N	Mean	SD	t-value	p-value	sign
Location	Urban	180	32.56	3.812	3.742	< 0.05	S**
	Rural	120	30.48	3.753			

(**- Significant at 0.01 level of significance)

The above table- 02 revels that the obtained t-value in the attitudes towards physics lessons and physical experiments of location scores level is more than the tabled values (2.58) at 0.01 levels of significance. Therefore the null hypothesis in this regard is rejected. It means that the obtained t-values are found to be significant. Therefore it is concluded that the urban students are better than rural students in attitudes towards physics lessons and physical experiments.

Table-03 The difference in the attitudes towards physics lessons and physical experiments scores high school students with reference to class.

	Variable	N	Mean	SD	t-value	p-value	sign
Class	8th standard	85	208.69	24.356	0.644	> 0.05	NS
	9th standard	90	207.04	19.895			
	8th standard	85	179.75	16.21	2.98	<0.05	S**
	10th standard	125	175.82	16.52			
	9th standard	90	117.50	16.55	0.74	>0.05	NS
	10th standard	125	176.58	16.49			

(*- Significant at 0.05 level of significance)

The above table- 03 revels that the obtained t-value in the attitudes towards physics lessons and physical experiments of class scores level is more than the tabled values (2.58) at 0.01 levels of significance. Therefore the null hypothesis in this regard is rejected. It means that the obtained t-values are found to be significant. Therefore it is concluded that the 10th standard students are better than 8th standard students in attitudes towards physics lessons and physical experiments. Whereas the obtained t-value in the attitudes towards physics lessons and physical experiments of class 8th and 9th standard and 9th and 10th standard students scores lesser than the tabled value at and 0.05 levels of significance. Therefore the null hypothesis in this regard is accepted.

Table-04 The difference in the attitudes towards physics lessons and physical experiments scores high school students with reference to Types of school.

	Variable	N	Mean	SD	t-value	p-value	sign
Types of school	Government	100	85.80	8.67	2.12	<0.05	S*
	Aided	100	87.13	7.95			
	Government	100	85.80	8.67	2.26	<0.05	S*
	Unaided	100	86.39	8.49			
	Aided	100	87.13	7.95	2.18	<0.05	S*
	Unaided	100	86.39	8.49			

(*- Significant at 0.05 level of significance)

The above table- 04 revels that the obtained t-value in the attitudes towards physics lessons and physical experiments of types of school scores level is more than the tabled values (1.96) at 0.05 levels of significance. Therefore the null hypothesis in this regard is rejected. It means that the obtained t-values are found to be significant. Therefore it is concluded that the Aided school students are better than Government students , unaided school students are better than Government students and Aided school students are better than unaided students in attitudes towards physics lessons and physical experiments.

Table-05 The difference in the attitudes towards physics lessons and physical experiments scores high school students with reference to Medium of instruction

	Variable	N	Mean	SD	t-value	p-value	sign
Medium of Instruction	Kannada	140	27.27	9.55	4.59	<0.05	S**
	English	160	23.73	9.24			

(*- Significant at 0.05 level of significance)

The above table- 05 revels that the obtained t-value in the attitudes towards physics lessons and physical experiments of medium of instruction scores level is more than the tabled values (2.58) at 0.01 levels of significance. Therefore the null hypothesis in this regard is rejected. It means that the obtained t-values are found to be significant. Therefore it is concluded that the kannada medium students are better than English medium students in attitudes towards physics lessons and physical experiments.

Conclusion

Similar results obtained by YeĢilyurt (2004) and ġengören et al. (2006). YeĢilyurt (2004) was found no significant difference between student teachers' groups of attitudes towards physics laboratory. And also, meaningful difference was not observed between of boys and girls of high school students' for the attitudes towards optic course obtained by ġengören et al.(2006). These results are in good agreement with the students' opinions obtained in this study. The following suggestions can be posed with the hope that students' interest and attitude towards physics lessons and physics laboratory in their education life may be constituted.

Educational Implications

1. Physics lessons being held in the classroom on the sole theoretical basis is one of the factors that influence attitude of the students toward these lessons in a negative manner.
2. Physical topics consist abstract concepts should be lectured in the students' daily life, together with simulations, animations and other videos to keep the attention of the students alive.
3. Learning by discovery is better than passive listening, so it should be shown how to associate physical concepts with their daily life of the students.
4. Increasing physics laboratory lessons' hours, hands-on-science experiments which may be executed with effective, attract attention with simple materials should be developed.
5. Studio physics which is a method of teaching that provides an integrated learning environment with hands-on lab measurements coupled with active student problem-solving should be apply in the physics lessons.
6. In order to make physics lessons more interesting, physics instructors should convince students that physics serves them. Physics instructors should spend more efforts to associate physics–tech-

nology–daily life. Physics instructors should like their profession and reflect this to others.

6. Instructors will improve the attitude of students towards physics lessons and physical experiments. However, it should be research whether teachers' training, teaching methods, students' families and environmental factors on influence students' attitude towards physics lessons.

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