International Journal of Education and Psychological Research (IJEPR) Volume 8, Issue 1, March 2019
Print - ISSN: 2349 - 0853, e-ISSN: 2279 - 0179 Available online at www.ijepr.org
Orignal Research Article Open Access

An Effectiveness of Activity Based Teaching Learning Strategies on Attitude towards Science among IX Standard Students

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Article History: *Received: 21st February 2019, Revised: 18th March 2019, Accepted: 18th March 2019, Published: 30th March 2019.*

I. INTRODUCTION

Today the process of education in a formal system is loaded with competition of notes, homework and so on. The all-round development of an individual personality has been minimized to a large extent. It is really possible to overcome all these problems and create a sense of healthy competition among the pupils in the present day system.

Greater emphasis in the present day situation is mainly on the concept of acquisition of knowledge; many approaches are made to bring good academic achievement of an individual. Researchers have shown that the effectiveness of education process depends on methodologies of teaching and learning adopted at various stages.

II. NEED FOR THE STUDY

The main aim of education is to modify the behavior of the child according to the needs and expectancy of the society. Behaviour is composed of so many attributes, one of these important attributes is attitude. One's behavior to a great extent depends upon his attitude towards the things, ideas, person or object in his environment. The entire personality and development of the child is influenced by the nature of his attitudes, learning of student and acquisition of habits, interest and other psycho social dispositions are all affected by his attitudes. So the teacher has to develop positive attitudes of learners in learning science with the help of activity based teaching learning strategies.

III. STATEMENT OF THE PROBLEM

"Effectiveness of activity based teaching learning strategies on attitude towards science among IX standard students".

IV. OBJECTIVES OF THE STUDY

The researcher has formulated the following objectives for the present study.

1. To measure the attitude to IX standard students towards science.
2. To prepare activity based teaching learning strategies in science to IX standard students.
3. To find out effectiveness of activity based teaching learning strategies on attitude towards science among IX standard students.

V. SCOPE OF THE STUDY

The present study attempts at preparation of activity based teaching learning strategies for secondary students. The study is confined to IX standard students of Hanagal Taluk, Haveri District.

VI. METHODOLOGY

For the present experimental study Two groups pre-test, posttest design was used by the researcher, subjects are selected randomly from the population and assigned randomly to control and experimental groups. Each group is given pre-test and post-test. Experimental group is exposed to the treatment. Administered pre-test on both groups, implementation of activity based teaching learning strategies on experimental group and posttest is administered after the treatment.

Experimental Design

Control Group	Experimental Group
Pre – Test (ATS)	Pre –Test (ATS)
Teaching by conventional Method	Teaching by ABTL strategies
Post – Test (ATS)	Post – Test (ATS)

VII. TOOLS USED FOR THE COLLECTION OF DATA

1. Attitude towards science scale constructed by Avinash Grewal.
2. Activity based teaching learning strategies prepared by researcher.

Activity based teaching learning strategies in science including the concept of science for 9th Standard students. It is being developed by researcher keeping in view the abilities and level of 9th standard students. Here learner proceeds at his own speed and space. Developing ABTLS involving

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1) Planning
2) Designing ABTLS device
3) Production of ABTLS Device
4) Follow-up.

With the help of above steps researcher made modules or activity based lesson plan in physics, chemistry and biology subjects. In physics researcher selected concepts are such as Motion, Laws of Motion, Gravitation, Work and Energy and Sound. In chemistry researcher selected concepts like Matter in our Surrounding, Is Matter around us pure and Atoms and Molecules. In Biology researcher selected concepts like Structure of Living Organism, Diversity in Living Organism and Tissues. To convey above concepts the researcher used so many activities in each lesson and clarify all the concepts clearly.

VIII. SAMPLE

For the present study simple random sampling technique was used. The sampling consists of secondary students of IX standard in Hanagal town Haveri district of Karnataka. These students are divided into two groups namely control and experimental group. They are equated by selecting the students randomly based on the marks obtained during 8th standard annual examination.

Statistical techniques used to analyze data: Paired 't' test, individual 't'test, ANCOVA and 2 way ANOVA were used to analyze the data.

IX. ANALYSIS OF DATA

Hypothesis 1: There is no significant difference between pretest and posttest scores of attitude towards science of high school students in control group.

To test this hypothesis, the Paired t-test was applied and the results are presented in the following table.

Table: Comparison between pre-test and post-test scores of attitude towards science of high school students in control group

Test	N	Mean	SD	Mean Diff.	SD Diff.	Paired t	P-value
Pretest	50	42.10	4.74				
Posttest	50	42.32	5.27	-0.22	2.03	-0.7651	0.4479, NS

The pre-test and post-test scores of attitude towards science of high school students in control group are similar.

Hypothesis 2: There is no significant difference between pretest and posttest scores of attitude towards science of high school students in experiment group.

To test this hypothesis, the Paired t-test was applied and the results are presented in the following table.

Table: Comparison between pre-test and post-test scores of attitude towards science of high school students in experiment group

Test	n	Mean	SD	Mean Diff.	SD Diff.	Paired t	P-value
Pretest	50	43.18	5.52				
Posttest	50	50.78	6.73	-7.60	5.76	-9.3233	0.0001*, S

*p<0.05

The posttest attitude towards science scores of high school students is higher as compared to pre-test attitude towards science scores of high school students in experiment group. From this we can conclude that ABTL strategies are effective in bringing changes in attitude scores of students in experimental group.

Hypothesis 3: There is no significant difference between control and experiment groups with respect to pretest scores of attitude towards science of high school students

To test this hypothesis, the Independent t test has been applied and the results are presented in the following table.

Table: Results of Independent t test between control and experiment groups with respect to pretest scores of attitude towards science of high school students

Groups	n	Mean	SD	SE	t-value	P-value
Control group	50	42.10	4.74	0.67	-1.0492	0.2967, NS
Experiment group	50	43.18	5.52	0.78		

The pretest scores of attitude towards science of high school students are similar in control and experiment groups.

Hypothesis 4: There is no significant difference between control and experiment groups with respect to posttest scores of attitude towards science of high school students

To test this hypothesis, the Independent t test has been applied and the results are presented in the following table.

Table: Results of Independent t test between control and experiment groups with respect to posttest scores of attitude towards science of high school students

Groups	n	Mean	SD	SE	t-value	P-value
Control group	50	42.32	5.27	0.75	-6.9972	0.0001*, S
Experiment group	50	50.78	6.73	0.95		

*p<0.05

The posttest scores of attitude towards science of high school students are different in control and experiment groups. In another words, the posttest scores of attitude towards science of high school students are significantly higher in experiment group as compared to control group.

Hypothesis 5: There is no significant difference between control and experiment groups with respect to change in attitude towards science scores of high school students from pretest to posttest

To test this hypothesis, the Independent t test has been applied and the results are presented in the following table.

Table: Results of Independent t test between control and experiment groups with respect to change in attitude towards science scores of high school students from pretest to posttest

Groups	n	Mean	SD	SE	t-value	P-value
Control group	50	0.22	2.03	0.29	-8.5378	0.0001*, S
Experiment group	50	7.60	5.76	0.82		

*p<0.05

The change in attitude towards science scores of high school students from pretest to posttest are different in control and experiment groups. In another words, the change in attitude towards science scores of high school students from pretest to posttest are significantly higher in experiment group as compared to control group.

Hypothesis 6: There is no significant difference between control and experiment groups with respect to pre-test and post-test scores of attitude towards science of high school students.

To test this hypothesis, the Analysis of covariance (ANCOVA) (pretest scores as covariate) technique has been applied and the results are presented in the following table.

Table: Comparison between control and experiment groups with respect to pre-test and post-test scores of attitude towards science of high school students by Analysis of covariance (ANCOVA)

Groups	N	Pretest		Posttest		
		Mean	SD	Mean	SD	Adjusted mean
Control group	50	42.10	4.74	42.32	5.27	42.77
Experiment group	50	43.18	5.52	50.78	6.73	50.33
F-test		1.1009@		77.7067#		
P-value		0.2967		0.0001*		

*p<0.05, @one way ANOVA applied, # ANCOVA applied

The results of the above table clearly show the following:

- The pre-test attitude towards science scores of high school students are similar in control and experiment group.
- The post-test attitude towards science scores of high school students are significantly higher in experiment group as compared to control group.

Hypothesis 7: There is no significant interaction effect of two groups (control and experiment) and gender (boys and girls) on change scores from pretest to posttest of attitude towards science of high school students

To test this hypothesis, the two way analysis of variance (ANOVA) with interaction design was applied and the results are presented in the following table.

Table: Results of 2-way ANOVA between two groups (control and experiment) and gender (boys and girls) on change scores from pretest to posttest of attitude towards science of high school students

Sources of variation	Degrees of freedom	Sum of squares	Mean sum of squares	F-value	p-value
Main effects					
Groups	1	1361.61	1361.61	72.5386	0.0001*
Gender	1	28.09	28.09	1.4965	0.2242
2-way interaction effects					
Groups x Gender	1	0.49	0.49	0.0261	0.8720
Error	96	1802.00	18.77		
Total	99	3192.19			

*p<0.05

From the results of it can be seen that,

- The students of high schools of control and experiment groups have different change scores from pretest to posttest of attitude towards science.
- The boy and girl students of high schools have similar change scores from pretest to posttest of attitude towards science.
- Hence, the null hypothesis is not rejected and alternative hypothesis is rejected.

Further, to know the pair wise comparisons of interaction effects of two groups (control and experiment) and gender (boys and girls) on change scores from pretest to posttest of attitude towards science of high school students by applying the Tukeys multiple posthoc procedures and the results are presented in the following table.

Table: Pair wise comparisons of interaction effect of two groups (control and experiment) and gender (boys and girls) on change scores from pretest to posttest of attitude towards science of high school students by Tukeys multiple posthoc procedures.

Interactions	Control boys	Control girls	Experiment boys	Experiment girls
N	25	25	25	25
Mean	0.68	-0.24	8.20	7.00
SD	1.57	2.35	5.85	5.73
Control boys	-			
Control girls	P=0.8762	-		
Experiment boys	P=0.0001*	P=0.0001*	-	
Experiment girls	P=0.0001*	P=0.0001*	P=0.7616	-

*p<0.05

The results of the above table, it clearly shows that,

- The control group boy students of high schools and control group girl students of high schools have similar change scores from pretest to posttest of attitude towards science.
- The control group boy students of high schools have significant smaller in change scores from pretest to posttest of attitude towards science as compared to experiment group boy students of high schools.
- The control group boy students of high schools have significant smaller in change scores from pretest to posttest of attitude towards science as compared to experiment group girl students of high schools.
- The control group girl students of high schools have significant smaller in change scores from pretest to posttest of attitude towards science as compared to experiment group boy students of high schools.
- The control group girl students of high schools have significant smaller in change scores from pretest to posttest of attitude towards science as compared to experiment group girl students of high schools.
- The experiment group boy students of high schools and experiment group girl students of high schools have similar change scores from pretest to posttest of attitude towards science.

X. FINDINGS

1. The pre-test and post-test scores of attitude towards science of high school students in control group are similar.
2. The posttest attitude towards science scores of high school students is higher as compared to pre-test attitude towards science scores of high school students in experiment group.
3. The pretest scores of attitude towards science of high school students are similar in control and experiment groups.
4. The posttest scores of attitude towards science of high school students are different in control and experiment groups. In another words, the posttest scores of attitude towards science of high school students are significantly higher in experiment group as compared to control group.
5. The change in attitude towards science scores of high school students from pretest to posttest are different in control and experiment groups. In another words, the change in attitude towards science scores of high school students from pretest to posttest are significantly higher in experiment group as compared to control group.
6. The pre-test attitude towards science scores of high school students are similar in control and experiment group. The post-test attitudes towards science scores of high school students are significantly higher in experiment group as compared to control group.
7. The students of high schools of control and experiment groups have different change scores from pretest to posttest of attitude towards science. The boy and girl students of high schools have similar change scores from pretest to posttest of attitude towards science. Hence, the null hypothesis is not rejected and alternative hypothesis is rejected.

XI. CONCLUSION

From the present study, we can conclude that Activity Based Teaching Learning Strategies influenced positive attitude towards science among IX standard students.

XII. IMPLICATION

1. The study helps the teachers to utilize the developed teaching learning strategies while teaching science in high schools.
2. The study motivates teachers to design new teaching learning materials.
3. It helps the teachers to improve the apparatus essential for teaching science in high schools.
4. It develops positive attitude towards learning science.
5. It helps to know the effect of Activity Based Teaching Learning Strategies on attitude towards Science.

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