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Effect of Science Technology Society Approach on Achievement Motivation in Biology of Secondary School Students of Kasaragod District

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Abstract: *Education is regarded as the potential instrument for social change and quality of education determined by the effectiveness of teacher and the teaching methods. The present study was conducted to investigate the effectiveness of Science Technology Society approach over activity oriented method of teaching on achievement motivation in Biology of Standard VIIth students. True experimental design was used to investigate the present study. A sample of 90 students was selected randomly for the study.45 students were randomly selected to form an experimental group and another 45 were selected randomly for control group. The experimental group was taught through STS approach and the control group was taught through activity oriented method of teaching. The data were collected and analysed with the help of appropriate statistical techniques. The result revealed that STS approach is more effective than Activity oriented method in bringing Achievement motivation among Secondary School students.*

Keywords: *Achievement Motivation, Science Technology Society, Secondary school students*

I. Introduction

In modern world knowledge increases at a terrific pace and social change is very rapid. Science and technology has greatly influenced the society. As the world progress, let us continue to progress with it and let us never forget our motto. Technology is most likely to have a positive impact on learning. It enhances learning when students have easy access to them in their classroom. The tremendous advance in Science and Technologies during the century had its impact on all human activities and new knowledge is coming everyday from various resources and our children facing tight competition. So they should be properly trained to tune with the fast moving and quick developing world.

Science Technology Society (STS) approach is an outlook on Science Education, that emphasizes the teaching of scientific and technological developments in their cultural, economic, social and political contents. The program provide a real world communication for the student between the classroom and the society. Here the perspective can be considered studying the social impact of science along with the science content being studied. In the view of science education, students are encouraged to engage in issues pertaining to the impart of science on everyday life and make responsible decisions about how to address such issues (Solemon, 1993 and Aikenhead, 1994). (1)

So in the 21st century age, we should cope up with fast moving society as well equipped social being. In order to reach such a high position, we must look for appropriate methodology for teaching concepts. The outcomes are directly related to the appropriate methodology of teaching The technology implementation provide increased teacher commitment, sustained increased level of technology use, improved coordination of resources for the project, focused resources, on the educational needs of students etc.

II. Need And Significance

Teaching in the 21st century means approaching students from their point of view. In a classroom the students are responsible for their learning. We are responsible for fulfilling that learning by finding the right strategies and methods to stimulate the students to learn. This is an era of information age of technology. So we cannot stick on to out dated methodology in biology teaching.

Major aim of education is to make students successful social being, therefore efforts should be taken to provide social practice along with formal education. Therefore the role of a teacher has taken on new dimensions and should give proper attention to change the strategy of instruction or introduce new techniques to meet our national needs.

Science and Technology has greatly influenced society. We should not under estimate the importance of education and the advantages of having a technologically sound educational background. In order to combat

the global challenges, we face, greater focus must be given to retreating our human resource in specialized areas.

Specific reasons for including societal issues in school science course are as follows:

- It justifies information included in science courses
- It allows students to find science classes relevant to their daily lives
- It enables teachers to evaluate student success at application and synthesis of ideal
- It redefines the teacher's role to be facilitator and relegates the text books status to information source.
- It may allow for increased scientific understanding of concepts (Yager & Lutz, 1995) (2)

The Science Technology Society Approach minimizes or eliminates the fear of difficulty. This approach aims to provide all students with their maximum potential literacy broadly defined, and then encourage and enable them to use their education for improving their lives. The implementation of students approach to engage the science students in scientific explorations around issues, questions of problems drawn from real life situations. In a study by Mitchener and Anderson (1989) (3) where finding indicated that some teachers may avoid covering social issues because of concerns about teaching methods. In order to avoid such situations, it is necessary to implement an innovative approach that deal with the social issues in classroom. Science Technology Society approach in education is an instructional device that enhances students capabilities in every aspects and provide a real world communication for the student between classroom and society (yager, 1990).(4)

Current reform movements in science education call for all students to be "Scientifically Literate". The prevailing system has not worked effectively in creating a scientifically educated citizenry. It is necessary that students are encouraged to engage in issues pertaining to the impact of science on everyday life and make responsible decisions about how to address such issues. (Solemon, 1993 and Aikenhead, 1994) (5) STS movement is an attempt to accomplish the goal through an in disciplinary approach to those three content areas science, technology and the society

III. Statement Of The Problem

The study was intended to find out the effect of STS approach in Biology on Achievement Motivation of Secondary School students of Kasaragod District through experimental method. Hence the study entitled as " Effect of Science Technology Society (STS) approach on Achievement Motivation in Biology of Secondary school students of Kasaragod District".

Objectives

To study the effect of Science Technology Society approach over Activity oriented method of teaching on achievement Motivation.

Hypotheses

1. Students taught through STS approach will significantly differ in their Achievement motivation than students taught through Activity oriented method of teaching.

2. Students taught through STS approach will be more effective in bringing more Achievement motivation than students taught through activity oriented method of teaching.

IV. Methodology

The study employs pre test- post test equivalent group design (true experimental design) of experimental method. Teaching strategies are treated as independent variable which involves STS approach and Activity oriented method and Achievement Motivation as the dependent variables. The control variables used were previous knowledge, Classroom environment, Socio-Economic-Status and Non verbal intelligence.

Design of the study

G_1 O_1 x O_2

G_2 O_3 C O_4

O_1 O_3 pre test

O_2 O_4 post test (Best and Kahn, 2006)

$O_2 - O_1$

$O_4 - O_3$ Gain score

G_1– Experimental Group, G_2 - Control Group

X – Exposure of a group to an experimental treatment

C – Exposure of a group to the control treatment

Samples

As it is an experimental study, the investigator delimited the area. Therefore two intact class divisions of standard VIIIth of 90 pupils (45 experimental and 45 control groups)of two schools of Kasaragod District were selected as a representation of the Secondary Schools of Kerala.

Tools

1. Lesson Transcript for Science Technology Society approach (Smitha & Aruna 2009)
2. Lesson Transcript for Activity Oriented method of teaching (Smitha & Aruna,2009)
3. Scale of Achievement Motivation (Smitha & Aruna, 2009)

In order to ensure equivalency of the groups, following tools were used for the study.

- Standard Progressive Matrices Test (Raven, 1958)
- Classroom Environment Inventory (Aruna & Sureshan, 1998)
- Achievement test (Smitha & Aruna,2009)
- Socio-Economic Status Scale (Nair, 1976)

Statistical Techniques

- Mean Difference analysis
- ANCOVA

V. Analysis And Interpretations

The collected data were subjected to statistical treatment. The result of the analysis is given in the following sections.

Investigator established the equivalence of experimental and control group using test of significance of difference between means for the control variables. The details of the result of the equivalence of the two groups are given in TABLE 1.

Table.1 .Mean Difference Analysis of the Pre test Scores of Control Variables between Experimental and Control Groups

Variables	Groups Compared	Mean	SD	N	t-value	Level of Significance
Achievement in Biology	Experimental	23.9556	6.47708	45	1.331	N.S
	Control	22.3556	4.8060	45		
Socio-Economic Status	Experimental	64.22	14.220	45	0.073	N.S
	Control	64.44	14.468	45		
Classroom Environment Inventory	Experimental	30.088	5.652	45	1.33	N.S
	Control	31.711	5.856	45		
Non-verbal Intelligence	Experimental	34.622	7.684	45	.043	N.S
	Control	34.556	7.146	45		

Result showed that experimental and control group does not significantly differ in their scores of Achievement test (previous knowledge), Non verbal intelligence, Classroom Environment and Socio- Economic-Status.

Mean difference analysis of pre test score of Achievement motivation between experimental and control group are given in TABLE 2.

TABLE2 Mean Difference Analysis of the Pre test Scores of Achievement Motivation between Experimental and Control Group

Variable	Experimental Group			Control Group			t-value	Level of Significance
	M_1	N_1	SD_1	M_2	N_2	SD_2		
Achievement Motivation	58.51	45	12.322	58.155	45	14.102	0.127	N.S

It can be inferred from the TABLE 2 that the obtained t -value for Achievement Motivation is found to be not significant even at 0.05 level. So it can be concluded that the pre experimental status of the subjects in both the group are same in their initial status.

Mean difference analysis of the post test scores of experimental and control group are given in TABLE 3

Table 3 Mean Difference Analysis of the Post test Scores of Achievement Motivation between the Experimental and Control Group

Variable	Experimental Group			Control Group			t-value	Level of Significance
	M_1	N_1	SD_1	M_2	N_2	SD_2		
Achievement Motivation	83.733	45	11.5609	74.466	45	11.682	3.782	0.01

From TABLE 3, it is cleared that there exist a significant difference between the mean of post test scores of Achievement Motivation between experimental and control groups. That is after the experiment the two groups differ significantly in their Achievement Motivation.

To study whether the experimental group and control group differ significantly or not with regard to Achievement Motivation in Biology of standard VIII pupils after controlling the effects of four control variables, covariance analysis was used. Even though the investigator established the equivalency of the groups, used ANCOVA. ANCOVA permits the experiments to statistically control for difference on the pre-test scores, so that post differences would not be due to initial difference prior to experiment.

Details of ANCOVA for Achievement Motivation is shown in the TABLE 4.

Table. 4 Summary of Single Factor ANCOVA for Achievement Motivation

	Source of Variation	Pre-test Score	Non-verbal Intelligence	Classroom Environment Inventory	Socio-Economic Status	Total effect
SS	Between groups	1807.648	1918.369	1613.423	1949.147	2082.288
	Within groups	8948.972	10706.410	11324.915	11267.263	9042.740
df	Between groups	1	1	1	1	1
	Within groups	86	87	87	87	84
MS	Between groups	1807.648	1918.369	1613.923	1949.147	2082.288
	Within groups	104.058	123.062	130.171	129.5009	107.652
	F	17.372	15.589	12.398	15.050	19.343
	Sig.	0.000	0.000	0.001	0.000	0.000
	Total	569535.000	576931.00	576931.00	576931.00	576931.00

From the TABLE 4, the five F-values obtained for Achievement Motivation are found above the limit set for 0.01 level of significance (6.90, 1, 87). This indicates, statistically significant difference exists between the experimental and control group even after controlling the five covariates. The F-values are greater than the tabled values at 0.01 level of significance.

Adjusted Means and Post Hoc Comparison

Since all the five F-values in ANCOVA were found significant, the investigator utilized Bonferronni's test of post-hoc comparison with each ANCOVA to determine which one of the two groups caused the variation in the criterion means. By this technique, the investigator could compare the adjusted criterion means of relevant groups, which show significant F-value.

Details of Post hoc comparison of Achievement Motivation is presented in TABLE 5.

Table.5 Bonferroni's Test of Post Hoc Comparison between Adjusted Means of Achievement Motivation

Groups Compared	Co-variate	N		Adjusted Mean		t-value	Level of Significance
		N_1	N_2	M_1	M_2		
Experimental & Control	Pre-test	45	45	84.29	73.90	10.39	0.01
	Non-verbal Intelligence	45	45	83.72	74.48	9.23	0.01
	Classroom Environment Inventory	45	45	83.38	74.82	8.56	0.01
	Socio-Economic Status	45	45	83.75	74.45	9.31	0.01
	Total Effect of Covariate	45	45	84.02	74.19	9.83	0.01

From the TABLE 5, it is clear that the experimental and control group based on instructional procedure differ significantly on their mean Achievement Motivation score, as the high mean scores are seen associated with the experimental group. This indicates the effectiveness of Science Technology Society Approach over constructivist method in terms of Achievement Motivation.

Major Findings

- Experimental and control groups does not show any significant difference in their previous knowledge, Non verbal intelligence, Classroom Environment and Socio-Economic-Status. The two groups are equal in their initial status.
- Two groups are equal in their initial status with regard to Achievement Motivation.
- Experimental group taught through STS approach achieved more on the post test of Achievement Motivation as compared with control group when the extraneous variables were not considered.
- Pupil taught through STS approach is superior to pupil taught through Activity oriented method of teaching after controlling the relevant extraneous variables, in terms of Achievement motivation.

Educational Implications

STS method will create a real impact on both formal and non formal education which has a huge role to play in bringing people towards a wider understanding of their real power to shape the future. STS is the

involvement of learners in experiences and issues which are directly related to their lives. STS develops skills which allow the pupils to become active, responsible citizens by responding to issues which import their lives. The experience of science education through STS strategies will create a scientifically literate citizenry for the 21st century. Science Technology Society accepts its responsibility to improve interactions with society and to have a responsibility to future generations to provide the knowledge and technology is that will enable long term sustainable future.

So in the light of findings of the present study, the investigator made a suggestion that, there is a need to introduce an effective teaching method that emphasis the uses of advancements in science and technology which enable pupil to solve relevant social issues. It is expected that the findings of the study will help the curriculum planners to make needed changes in the content regarding the implementation of linking science, technology and the society.

VI. Conclusion

As per the first hypothesis it was found that there exist significant difference in the mean Achievement Motivation between the experimental and control groups. Hence, as per the second hypothesis, substantiate the superiority of STS approach over Activity oriented method of teaching. This is due to the fact that STS is an interdisciplinary approach so that it interrelate the concepts to be taught.

References

[1]. Solomon, J., & Aikenhead, G, STS education: International Perspectives on reform. (New York: Teacher's College, 1994).
[2]. Yager, R. E., & Lutz, M. V. (1995). STS to enhance total curriculum. "Science and Mathematics", 95(1), 28-35. (EJ 504082)
[3]. Mitchner, C.P., & Anderson, R.D. (1989). Teacher's perspective: Developing and implementing an STS curriculum. Journal of Research in Science Teaching, 26(4), 351-369.
[4]. Yager, R.E. (1990). "The science/technology/society movement in the united states: its origin, evolution, and rationale". Social Education, 54(4), 198-200.
[5]. Best, John, W., & Kahn, James, V, Research in education (10th Ed.). (New York: United States of America, 2006).