# PROCESS APPROACH: EFFECT ON ATTITUDE TOWARDS SCIENCE AND PROCESS SKILLS IN SCIENCE

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*The present study intended to find out the effectiveness of process approach in science on attitude towards science and process skills in science of secondary school students. There is a need for the teacher to be aware of other process skills mentioned in the science literature. These include hypothesising, experimenting, inferring and concluding. The investigators adopted an experimental design for the study. A sample of 70 students from standard IX was selected for the study. Adequate tools were used for collecting the data. The results revealed that the process approach was well suited for enhancing the attitude towards science and process skills in science of secondary school students.*

## INTRODUCTION

Education is very much intimate with the individuals' process of growth. It is a continuous re-organisation or re-construction of the individual life experience. Since the basic natural science is the fountain head of knowledge for the applied sciences, its importance to the technological process of civilisation is well established. Similarly, science has crucial contribution to the preservation of the planet earth which is capable of supporting and nurturing life. There has been concern not only that the natural sciences be given a role in the school curriculum that is commensurate with their contributions to our lives, but also that the approach to scientific study in the schools reflect the nature of scientific study in both natural and applied sciences. There is an urgency today that makes acquiring science skills even more important now than they were in earlier years. In this technological age, knowing how to acquire and evaluate information and know how to use it to understand and solve problems is a pre-requisite for most jobs our students will have as adults. Process skills in science are very important in teaching science to children. If the children are introduced to science properly will find the process skills useful throughout life. Process skills tend to remain with many individuals for a relatively longer period. Process skills in science for children emphasize the use of our five sense organs. Science a process approach was a project of American Association for the advancement of science (AAAS), during 1962-1968 stressed this new development of science teaching in curriculum. Today there is a shift of emphasis on the mastery of the subject through the acquisition of skills in the process of how knowledge is gained has been generally accepted. Bunsen (1968) conducted study on comparison of methods of science using process approach. The results showed that the students exposed to the process approach method scored significantly than the students who were unexposed to that method. Patricia (1971) investigated the effect of process approach on intelligence, reading comprehension and interest in science and reported about the effectiveness of process approach in enhancing the level of intelligence, interest of students. The reading ability was also found to be increased by this approach.

## OBJECTIVES OF THE STUDY

1.To compare the mean pre-test scores and post-test scores of Attitude towards Science of the experimental and control group.
2.To compare the mean pre-test scores and post-test scores of Process Skills in Science of the experimental and control group.

## METHOD

Two intact classes were selected from one school. The investigator selected 35 students each from two classes randomly and assigned one as the experimental group and other as control group. The pre-test post-test equivalent group design was selected for the study.

**Tools**
Lesson Transcript for Process Approach Model of Teaching; Lesson Transcript based on Constructivist Model of Teaching; Achievement

Test in Biology of STD IX Pupils; Classroom Environment Inventory; Socio-Economic Status Scale; Standard Progressive Matrices Test by Raven; Test of Process Skills in Science for the Secondary School Pupils; and Scale of Attitude towards Science.

**Lesson Transcripts for Process Approach Method of Teaching**
Lesson transcripts for process approach method of teaching have prepared by the investigator on the basis of process skill oriented method. The steps in the lesson transcript were: Goals; Objectives; Pre-requisites; Materials/Resources; Lesson description; Lesson Procedure; and Assessment / Evaluation.

**Lesson Transcript for Constructivist Method of Teaching**
Lesson transcript for constructivist method of teaching have prepared by the investigator on the basis of teacher centered curriculum prevailing in the present secondary school classes. The steps in the lesson transcript were: Curriculum objectives; Learning materials; Development; and Follow up activities

**Statistical Techniques Used**
The statistical techniques used were: Arithmetic mean; Standard Deviation; and Test of Significance of difference between means

**Execution of the Experiment**
For testing the homogeneity of the sample, the investigators administered the test of intelligence, Socio-Economic Status Scale, Classroom Environment Inventory and Achievement Test. After analysing the results, the homogeneity of the two groups were ensured. Then randomly selected 35 students from the total sample and assigned as experimental group and another 35 students were assigned as control group. For checking the initial status of Attitude towards Science and Process Skills in Science a pre-test was
conducted. After that the two groups were taught by one of the
investigators, experimental group by Process Approach method and

control group by constructivist method. 30 lesson plans were taught for the two groups. After the experimental treatment, post test for the two dependent variables was conducted.

**ANALYSIS**
**Comparison of the Mean Performance on the Pre-test Scores of Attitude towards Science**
A pre-test on Attitude towards Science test was administered to pupils in order to compare the pre-test on Attitude towards Science of the two groups of STD IX. The scores obtained in both the experimental and control group were subjected to a test of significance of the difference between means of the groups. The obtained t-value (1.02) is below the limit set for 0.05 level of significance (1.96). So it can be noted that there is no significant difference in the mean scores of Attitude towards Science of experimental and control group. In the comparison, the two groups are almost equal in their Attitude towards Science.

**Comparison of the Mean Performance on the Post-test Scores of Attitude towards Science**
A post-test on Attitude towards Science test was administered in order to compare the Attitude towards Science of the two groups of STD IX. The scores obtained in both the experimental and control group were subjected to a test of significance of the difference between means of the groups. The obtained t-

value (4.24) is above the limit set for 0.05 level of significance (1.96). So it can be noted that there is significant difference in the mean scores of Attitude towards Science of experimental and control group. In the comparison, the higher the mean scores are seen associated with experimental group. This indicates the superiority of experimental group over the control group in the case of Attitude towards science.

**Comparison of the Mean Performance on the Pre-test Scores of Process Skills in Science**
A pre-test on Process Skills in Science was administered to pupils

in order to compare Process Skills in Science of the two groups of STD IX. The scores obtained in both the experimental and control group were subjected to a test of significance of the difference between means of the groups. The obtained t-value (0.11) is below the limit set for 0.05 level of significance (1.96). So it can be noted that there is no significant difference in the mean scores of Process Skills in Science of experimental and control group. In the comparison, the two groups are almost equal in their Process Skills in Science.

**Comparison of the Mean Performance on the Post-test Scores of Process Skills in Science**
A post-test on Process Skills in Science test was administered to pupils in order to compare the Process Skills in Science of the two groups of STD IX. The scores obtained in both the experimental and control group were subjected to a test of significance of the difference between means of the groups. The obtained t-value (3.92) is above the limit set for 0.05 level of significance (1.96). So it can be noted that there is significant difference in the mean scores of Process Skills in Science of experimental and control group. In the comparisons, which have shown, significant t-value the higher the means scores are seen associated with experimental group. This indicates the superiority of experimental group over the control group in the case of Process Skills in Science in the post-test.

## CONCLUSION

There is significant difference in the mean scores of experimental and control group for the two variables, Attitude towards Science and Process Skills in Science. At initial status, there was no significant difference in the mean scores of pretest of Non-Verbal Intelligence, Classroom Environment Inventory, Socio-Economic Status and Achievement in Science. From the findings, it is evident that the Process Approach in Science is superior to the constructivist model of teaching for increasing Attitude towards Science and Process Skills in Science. The new approach helps the teacher to increase

his/her knowledge about the outcome of teaching. In ordinary classroom teaching model, there may not been much emphasis on the development of process skills. The skill which are developed, really help students to nurture a new world in their learning approach. They feel more close to nature in their learning approach.. Teachers need to select curricula which emphasize science process skills. In addition they need to capitalise on opportunities in the activities normally done in the classroom.

## EDUCATIONAL IMPLICATIONS

The present study revealed that the process approach teaching is effective for proper development and understanding of process skills in science and also to develop or increase the attitude toward science. Though the investigators carried out these studies on a small sample, the findings throw light on the current educational practice in secondary classes. Science is a process as well as a product. The understanding of this process is possibly only when the individual will get thorough knowledge about the skills involved in each process. Without the understanding of skills, one cannot follow or study about the scientific process. So the students have to be trained for better understanding of skills. The teacher has a pivotal role in administering changes among children. The approach used by the teacher, therefore, should be to bring a desirable change in the student. It is seen that the positive attitude towards science is

essential for each individual to live a harmonious life in the nature. The attitude developed by the student, therefore, is beneficial for both the individual and to the existence of nature. Teachers should help the children to develop a desirable scientific attitude.

**REFERENCES**

Bunsen, D. M. (1968) *A Comparison of Methods of Science in Service Education for Elementary Teachers utilizing the*
*American Assoication for the Advancement of Science: A Process Approach Material*. [ERIC Document Reproduction Service No: ED 031393].

Hoover,W.A. (1996) The practical implications of constructivism. *Research in Science and Technology in Education* 13, 56-59.

Patricia, K. (1971) *The Effects on the Intelligence, Reading, Mathematics and Interest Levels of Third Grade Students Who Have Participated in Science- A Process Approach Since First Entering School.* [ERIC Document Reproduction Service No: ED 075174].

Nair, A.S., Pillai, N.P. & Amma (1976) *Kerala University Verbal Group Test of Intelligence*. University of Kerala, Trivandrum.

Raven, J.C. (1958) *Standard Progressive Matrices.* Manasayan, Trivandrum.