ATTAINMENT OF PROCESS SKILLS IN PHYSICS AND SOCIO-ECONOMIC STATUS OF HIGHER SECONDARY SCHOOL STUDENTS

Research Paper

ABSTRACT

The development of the scientific method is inseparable from the history of science itself. The development and elaboration of rules for scientific reasoning and investigation has not been straightforward; and scientific method has been the subject of intense and recurring debate throughout the history of science. An important outcome of science learning is the understanding and proficiency in the use of scientific processes in various academic and life situations. Science process outcomes include both mental and physical abilities known as scientific skills. In general, affective variables showed a considerable influence and interaction on attainment of science process skills depending on the skills, contexts and culture. Present study examined if the SES of students make any difference in their attainment of process skills in physics of higher secondary school students. The study conducted on a sample of 1320 higher secondary school students of Kerala. The study found SES difference is significant in Attainment of Process skills in Physics. Students from high socio economic back ground perform better in terms of process skills in physics.

INTRODUCTION

The development of the scientific method is inseparable from the history of science itself. The development and elaboration of rules for scientific reasoning and investigation has not been straightforward; and scientific method has been the subject of intense and recurring debate throughout the history of science, and many eminent natural philosophers and scientists have argued for the primacy of one or another approach of establishing scientific knowledge. Understanding the importance of giving training in scientific process, different educational experiments and curriculum reforms were took place during 1960's and 1970's. And such process models of science curriculum articulate a humanistic alternative to means end or objective model. The curriculum emphasized intellectual processes of inquiry and discovery approach to science learning. According to Nay (1971) these reforms mainly included the terms 'scientific inquiry', 'learning by discovery' and' teaching 'the process of science' in their philosophy and objectives. As Bruner (1963) suggested 'the chief purpose in teaching a subject or discipline, is to teach the student to participate in the processes that makes possible to the establishment of knowledge. Current curricular changes bring to what is called methodological objectives, by this means whatever cognitive, affective, psychomotor, processes, the student engages in and develops knowledge peculiar to the subject matter he is investigating'. In general, the science curricular reforms thus developed in various countries including India emphasized two things. First one is the use of development of science inquiry and science process skills with an assumption that conceptual understanding is a product of scientific thinking process and second is to create citizens who understand science in ways that will enable them to participate intelligently in critical thinking and problem solving and decision making about how science and technology are used to change society.

An important outcome of science learning is the understanding and proficiency in the use of scientific

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processes in various academic and life situations. Science process outcomes include both mental and physical abilities known as scientific skills. Science process skills involve skills useful for various scientific purposes. Present study grouped thirteen science process skills suggested by AAAS (1975) into three categories as; 1.Technical skills which include, Observing, Classifying, Measuring, Using space time relations, Using number relations and Communicating skills, 2. Data Processing skills include Interpreting, Inferring, Predicting, and Hypothesizing skills and 3. Integrated Process skills include Controlling variables, Making operational definitions, and Experimenting skills.

BACKGROUND OF THE STUDY

Studies reported that student's personality characteristics are found to positively influence theeffective use of science process skills in science teaching learning situations (Yesudasi, 1998; Joseph & Suresh, 2001). While some other studies showed that personality characteristics interacts or do not influence process skills attainment (Haukoos, 1981; Ramesh, 1984). Several students' characteristics may influence their academic outcomes. In case of process skills in science, as it is a practice and use of cognitive and motor skills, the students characteristics may also have sufficient influence. Socio economic status difference was found with process skills achievement (Joseph, 1998; Walter & Soyibo, 2001; Dokme & Aydinli, 2009). School type and demographic variables were found to have an influence (Myers, 2004; Chandran, 1996). In general, affective variables showed a considerable influence and interaction on attainment of science process skills depending on the skills, contexts and culture. So, investigator finds the necessity to study influence of SES on attainment of process skills in physics of higher secondary school students of Kerala.

OBJECTIVE

To compare the attainment in each of the thirteen Process Skills in Physics of higher secondary school students with high and low SES.

HYPOTHESIS

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There will be no significant difference in the attainment in each of the thirteen Process Skills Physics of higher secondary school students with high a low SES.

METHODOLOGY

The study used survey method. The study w conducted on a sample of 1320 higher secondary sch students of Kerala. The study used proportionate stratifi random sampling, giving due representation to gend locale and type of management.

TOOLS USED

The tools used in the study are; 1) Test of Pro Skills in Physics (Lavanya & Kumar, 2013). The tes conducted for thirteen process skills in physics suggest by AAAS (1975). In the final form each skill contai eight questions with four options in which only one answ is correct. 2) General data sheet is used to assess SES students.

STATISTICAL TECHNIQUES USED FOR TH STUDY

For the preliminary analysis of dependent variable mean, median, mode, skewness and kurtosis were use To find out group differences, test of significance difference between means was used.

ANALYSIS AND INTERPRETATIONS

Comparison of High and Low SES students in ter of Attainment of Technical Process Skills in Phys

Data and result of comparison of High and Low S students in terms of Attainment of Technical Process Sk in Physics were given in Table 1. The comparison conducted for thirteen process skills namely, Observi Classifying, Measuring, Using space time relations, Us number relations, Communicating skills, Interpret Inferring, Predicting, Hypothesizing skills, Control variables, Making operational definitions, Experimenting skills.

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Table 1

COMPARISON OF GROUP MEAN SCORES OF PROCESS SKILLS IN PHYSICS FOR HIGH AND LOW SES STUDENTS

	Groups Compared	High SES			Low SES				
	Process skills	M_1	SD_1	N_1	M_2	SD_2	N_2	df	t value
1	Observing	6.87	1.62	532	6.2	1.64	788	1318	7.36**
2	Classifying	6.81	1.58	532	6.25	1.64	788	1318	6.09**
3	Measuring	5.22	1.45	532	4.64	1.65	788	1318	6.62**
4	Communicating	5.89	1.41	532	5.35	1.55	788	1318	6.43**
5	Using Number relations	5.86	1.34	532	5.21	1.37	788	1318	8.51**
6	Using Space Time relations	5.69	1.27	532	5.15	1.34	788	1318	7.23**
7	Inferring	5.74	1.33	532	5.23	1.44	788	1318	6.05**
8	Predicting	4.91	1.22	532	4.38	1.34	788	1318	7.29**
9	Interpreting	4.95	1.39	532	4.44	1.48	788	1318	6.25**
10	Making Operational Definitions	5.65	1.74	532	5.06	1.67	788	1318	6.10**
11	Controlling Variables	4.78	1.47	532	4.2	1.49	788	1318	6.92**
12	Hypothesizing	5.04	1.48	532	4.42	1.55	788	1318	7.17**
13	Experimenting	4.73	1.39	532	4.18	1.43	788	1318	6.88**
14	Process Skills (Total)	72.17	16.36	532	64.79	17.07	788	1318	7.83**

** indicates $p<0.01$

Students form high and low socio economic levels significantly different in terms of each of thirteen process skills selected in this study. Students from high and low socio economic status differ in terms of Observing, Classifying, Measuring, Using space time relations, Using number relations, Communicating skills, Interpreting, Inferring, Predicting, Hypothesizing skills, Controlling variables, Making operational definitions, and Experimenting skills. That is socio economic backgrounds of students significantly influence their process skills attainment. Even though SES does not seem to have a logical influence on process skills, the factors associated with socio economic background may affect the skill attainment. The educated parents of the students may encourage their children and their awareness may help their wards to perform better. Moreover, the facilities available to the children in terms of books, periodicals, equipments may differ for different SES families. This may also influence their expertise and practicing of skills.

CONCLUSIONS AND EDUCATIONAL IMPLICATIONS

The study found SES difference is significant in Attainment of Process skills in Physics. Students from high socio economic back ground perform better in terms of process skills in physics. As process skills include cognitive and physical skills and also nothing to do with social or economic back ground of students, it seems to have a sufficient influence on these skills. Parents educational levels, parent aspirations, their awareness, facilities and equipments available at home, parents income, their social status may influence the practicing and attending of these skills. Students from high socio economic status may be encouraged with the facilities and parental aspirations. Parents from low educational background may not find and encourage their children's science skills like observing. classifying, experimenting, they may not be even aware of the importance of these skills in science learning. Lack of facilities and encouragement may affect students from low SES background to practice in these

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