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CONSTRUCTIVISM BASED LEARNING STRATEGY (CBLS) IN THE ACQUISITION SCIENCE PROCESS SKILLS

Dr. R. Ramnath

Assistant Professor, Department of Education, Alagappa University, Karaikudi

Abstract

One of the strongest themes in the National Science Education Standards (NSES) (National Research Council 1996) and Benchmarks for Science Literacy (Benchmarks) (American Association for the Advancement of Science 1993) was that all children can learn science and that they should have the opportunity to become scientifically literate. In order for this learning to happen, the effort to introduce children to the essential experiences of science inquiry and explorations must begin at an early age. A national consensus evolved around what constitutes effective science teaching and learning for young children. More than ever before, educators agreed that preschool level and primary level science is an active enterprise. The Constructivism is a theory evolved out of the combination of Philosophy, Psychology, and Science is used as a yard stick to verify the science process skills. The results arrived by all the methodology and statistical procedures showed the impact of CBLS in a positive manner and the variables have no influence in the acquisition of process skills.

***Key words**: CBLS, Process Skills, Acquisition and Strategy.*

Introduction

Science is understood to be a process of finding out and a system for organizing and reporting discoveries. Rather than being viewed as the memorization of facts, science is seen as a way of thinking and trying to understand the world. This agreement can be seen in the national reform documents NSES, Benchmarks and Science for All Americans (American Association for the Advancement of Science 1989). Both NSES and Benchmarks are aligned with the guidelines from the National Association for the Education of Young Children (Bredekamp 1987; Bredekamp and Rosegrant 1992; Bredekamp and Copple 1997). Science Education 21st century must be oriented to meet the challenges of covering the entire population in promoting scientific literacy. The principal goal of science education is to create men who are capable of thinking for themselves. It is the inherent nature of children to learn and to go on learning on their own endlessly. It is also an innate part of the nature of the human mind to identify nature, order, compare, control, construct, demonstrate, state and apply a rule and finally consolidate them in to valuable concepts and it is through the science curriculum that they can be initiated and fostered in children.

Concept Background

The Kothari Commission (1964-66) said *"If you will teach content, then who will teach science?"* It was opined by the commission that science was just not content and felt

that if the stress was shifted from content to process, then content would be automatically included, but much more meaningfully. It is unfortunate that even today, in our schools, science is usually taught by lecture or at the best by lecture demonstration method. Children are selection involved in scientific activities using their own hands. The current innovations in schools are emphasizing the processes of science, the way in which scientists advance their knowledge and solve problems. Educationists recommend that science should be presented to the pupils in such a way that they conduct an inquiry in to the nature of things as well as a body of information built by the other people. It is a general practice, that process aspect is neglected and school science emphasizes body of knowledge.

Need

Children acquire fundamental concepts through active involvement with their environment. As they explore their surroundings, they actively construct their own knowledge. Charlesworth and Lind (1995) characterize specific learning experiences with young children as *naturalistic* (or spontaneous) Informal *or structural*. These experiences differ in terms of who controls the activity: the adult or the child, *Naturalistic* experiences are those in which the child controls choice and action; in informal experience, the child chooses the activity and action, but adults intervene at some point; and in structured experiences, the adult chooses the experience for the child and give some direction to the child's action. Hence, it is need of the hour to study the science process skills of the students and its level.

Objective

The study attempted to find out the acquisition of the selected (following) science process skills by using constructivism based learning strategy.

Observing, Identifying, Classifying, Inferring, Exploring, Hypothesizing, Justifying and Generalising.

Sample

A total number of Two Hundred and One students who are studying IX standard are selected as sample of the present study. The whole sample is selected by means of the simple random sampling technique with the consideration of the variables such as Gender and Locality of the students.

Procedure

The selected samples were included for the test of science process skills along with other candidates. The marks were calculated to establish the homogeneity of the group. The constructivism based learning strategy was administered to the students foe three weeks.

Hypothesis 1:

There will not be great difference between the mean of science process skills in the acquisition by the students.

Table 1: Science Process Skills – Process Wise

S. No	Skill	Mean	% of Mean	SD
1.	Observing	2.65	53.19	1.16
2.	Identifying	3.40	68.14	1.25
3.	Classifying	2.33	46.69	0.94
4.	Inferring	1.57	31.36	1.20
5.	Exploring	1.84	36.72	1.02
6.	Hypothesizing	1.91	38.23	0.95
7.	Justifying	1.83	36.66	1.01
8.	Generalising	2.30	45.90	1.05

From the above table it can be seen that the % of Mean of acquisition of Science Process in the skill Identifying is 68.14 which indicates best performance compared to all the remaining skills and % of Mean of acquisition of Science Process in the skill Inferring skill is 31.36, which indicates least performance compared to other remaining skills. It is also heartening to see that 53.19% of the pupils have observing skill. The skills acquisition in descending order of Mean are Identifying (68.14%), Observing (53.19%), Classifying (46.69%), Generalizing (45.99%), Hypothesizing (38.23%), and Exploring (36.72%). Justifying (36.66%) and Inferring (31.36%). Since there is difference between the mean of science process skills @ 36.78% (i.e. Best 68.14 and least 31.36), it is inferred that there is significant difference between each skill. Hence, the hypothesis framed by the investigators is rejected.

Hypothesis 2:

There exist positive correlations between all the science process skills.

Correlation Matrix between the Eight Process Skills

The following table 2 shows the Inter correlation Matrix between the Eight Process Skills chosen.

Table 2 Inter Correlation Matrix

		1	2	3	4	5	6	7	8
S. No.	**Skill**	**Observing**	**Identifying**	**Classifying**	**Inferring**	**Exploriting**	**Hypothesizing**	**Justifying**	**Generalising**
1.	Observing	-	0.31*	0.10^{NS}	0.28*	-0.11	0.14^{NS}	0.23^{NS}	0.15^{NS}
2.	Identifying	0.31*	-	0.29*	0.39*	0.06	0.18^{NS}	0.31*	0.38*
3.	Classifying	0.10^{NS}	0.29*	-	0.02^{NS}	0.14	0.10^{NS}	0.18^{NS}	0.10^{NS}
4.	Inferring	0.28*	0.39*	0.02^{NS}	-	-0.09	0.21^{NS}	0.18^{NS}	0.33*
5.	Exploring	-0.11^{NS}	0.06^{NS}	0.14^{NS}	-0.09^{NS}	-	0.03^{NS}	0.05^{NS}	0.00^{NS}
6.	Hypothesising	0.14^{NS}	0.18^{NS}	0.10^{NS}	0.21^{NS}	0.03	-	0.12^{NS}	0.23^{NS}
7.	Justifying	0.23^{NS}	0.31*	0.18^{NS}	0.18^{NS}	0.05	0.12^{NS}	-	0.26^{NS}
8.	Generalising	0.15^{NS}	0.38*	0.10^{NS}	0.33*	0.00	0.23^{NS}	0.26^{NS}	-

Note:

γ>0.273 is significant at 0.05*

γ>0.54 is significant at 0.01**

NS: Not Significant at 0.05 levels.

The above table 2 shows two negative correlations. Those are

1. Between Observing and exploring this is nearly negligible at -0.11.
2. Between Exploring and inferring this is nearly negligible at -0.09.

The rest of the correlations are positive ant the correlation ranges from 0.00 to 0.39.

Overall we can say that there is a positive correlation between six of the eight basic process skills with appreciable correlation between Inferring and identifying (0.39). Since there are two negative correlations, it is inferred that all the science process skill are not correlated with each other. Hence, the hypothesis framed by the investigators is negated.

Hypothesis 3:

The variable Gender has influence in the acquisition of Science Process Skills.

Influence of Gender in Acquisition of Science Process Skills

The study attempted to find out gender difference existed in the eight class pupil with respect to acquisition of Science Process Skills and table 3 presents data related to it.

Table 3: Influence of Gender in Acquisition of Science Process Skills of VIII class pupil

Gender	N	Mean	SD	't' value
Boys	140	17.26	6.84	0.67^{NS}
Girls	61	16.57	6.29	

NS- Not Significant difference at 0.01 level.

From the above table it can be seen that the mean acquisition of Science Process Skills and SD of boys is 17.26 and 6.84 and mean acquisition of Science Process Skills and SD of girls is 16.57 and 6.29.

The obtained 't' value 0.67 indicates that there is no significant differences between boys and girls in their Science Process Skills at 0.01 level. The result obtained is that boys acquired more Science Process Skills than girls, which shows that boys have more artistic skills than girls and are naturally inclined towards science. Hence, the hypothesis framed by the investigators is rejected.

It has been observed in the above study that the boys have better knowledge about science subject than girls. This could be attributed to the fact that boys have more family support than girls. Boys have much time at home compared to girls students, because girls have to attend to domestic work also. Generally boys inherently have more interest to know about the nature than girls.

Hypothesis 4:

The variable locality has an influence in the acquisition of Science Process Skills.

Influence of Locality on Acquisition of Science Process Skill

The study attempt to find out of locality differences existed in the eighth class pupil with respect to acquisition of Science Process Skills and Table 4 presents data related to it.

Table 4: Influence of Locality on Acquisition of Science Process Skill

Locality	N	Mean	SD	't' Value
Urban	152	17.22	5.35	0.65^{NS}
Rural	49	16.51	9.74	

From the above table it can be seen that the mean acquisition of Science Process Skills and SD of Urban students is 17.22 and 5.35 and mean acquisition of Science Process Skills and SD of rural students is 16.51 and 9.74.

The obtained 't' value 0.65 indicates that there is no significant differences in urban and rural students in their Science Process Skills at 0.05 level. The result obtained is that urban students acquired more Science Process Skills than rural students. Hence, the hypothesis framed by the investigators is rejected.

It has been observed in the above study urban students have better knowledge about science subject than rural students. This could be attributed to the fact that urban students have more facilities like well equipped labs, libraries and qualified teachers etc. Generally, these facilities do not have rural students.

Educational Implications

The findings about the science process skills help us to construct curriculum, designing instructional methods, setting has an implication over the process is very important to the processes end they will teach science as a Process not as a content. Thus, this study sets significance in various aspects of the educational process.

Conclusion

This study indicates us that the acquisitions of science process skills are easier through constructivism based learning strategy. The skills are almost correlated with each other. The variables gender and locality have no influence in the acquisition of science process skills. Finally it has been perceived that the science process skills can be acquired through constructivism based learning strategy.

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