EFFECT OF INSTRUCTIONAL STRATEGY BASED ON FIBONACCI NUMBER SEQUENCE FOR ENHANCING INTEREST AND SKILL OF OBSERVATION IN LEARNING SCIENCE AMONG ELEMENTARY SCHOOL STUDENTS

Research Paper

ABSTRACT

The study aims at finding out the effect of instructional strategy on interest in learning science and observation skill of elementary school students. The strategy integrates Fibonacci-a mathematical concept- and science. For developing the instructional strategy, the investigator prepared a lesson package which involves the application of Fibonacci in the environment. The investigator selected two groups namely experimental group and control group-with 35 students in each group. The experimental group was taught through new instructional strategy based on Fibonacci number sequence and the control group was taught through activity oriented method. A pre test and a post-test for interest in learning science and observation skill were administered for both experimental group and control group before and after the treatment. The study revealed that the new instructional strategy based on Fibonacci Number Sequence was found to be comparatively more effective than that of existing method in enhancing interest in learning science and observation skill among elementary school students.

INTRODUCTION

Teaching elementary science is as much an art as it is scientific. Science captures the imagination and curiosity of young children and develops number of transferable skills including numeracy, literacy, communication, team work, problem solving and analytic thinking. Elementary science fosters a link between children and the world around them, something vitally important in the modern world.

Recognizing the importance of developing science skills in elementary school children, a careful defining and organizing of those skills are necessary. But now it is not sufficient for implementing change. A major stumbling block is that the focus of teaching science skills in isolation from their real world applications. Today primary teachers' scientific knowledge is widely recognized as having improved but the debate over the level and nature of scientific knowledge needed by primary teachers in order to teach effectively remains alive.

Teaching science effectively is difficult but a rewarding work. The difficulty stems from two sources. First, the students in most science classes bring a wide range of prior knowledge, experiences, reasoning and interests. Second, teachers must integrate the core body of scientific knowledge and scientific enquiry in a way that does justice to both the aspects of science and their integration. Teaching is a purposeful means to help students learn. When students work hard but fail to learn, the teacher must accept a large part of the responsibility. Teachers must embrace the view that effective teaching means constantly being aware of and attending to students struggles to learn science and continually adjust their teaching strategies and techniques to help students work through difficulties. Teachers must understand how learners actively construct new knowledge as well as complexity of learning process, the importance of students' interests

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and students' potential anxieties and conflicts with science concepts. Teacher should help the students to recognize the importance of usefulness and value of science in their personal lives.

NEED AND SIGNIFICANCE OF THE STUDY

The world is a rapidly changing environment which needs inspired scientists to continue the process of discovery waves all sectors. All of these start with primary school education experience. Interest is an important motivator throughout scientific investigations and playfulness plays a role in the research ideas (Ganschew and Ganschow, 1998).Increase in interest in science and desire to teach science through inquiry suggest that the fun and interesting activities of varying levels of inquiry had a major effect on students.

In this technological society students should leave primary school with a positive attitude to science and grounding in some of the basic concepts with good primary education. It is essential to focus more on observation rather than writing assignments. It doesn't need to be coloring of sheets and answering lots of questions just for the assessment. Young children need to enjoy the world to become passionate about it.

OBJECTIVES OF THE STUDY

1. To compare the effectiveness of Instructional Strategy based on Fibonacci Number Sequence and Activity Oriented Method for enhancing Interest in learning Science among Elementary School Students by considering pre-test as a covariate.
2. To compare the effectiveness of Instructional Strategy based on Fibonacci Number Sequence and Activity Oriented Method for enhancing Skill of Observation in learning Science among Elementary School Students by considering pre-test as a covariate.

HYPOTHESES OF THE STUDY

1. There exists significant difference in the effectiveness of Instructional Strategy based on Fibonacci Number Sequence and Activity Oriented Method for enhancing Interest in learning Science among Elementary School Students by considering pre-test as a covariate.
2. There exists significant difference in the effectiveness of Instructional Strategy based on Fibonacci Number Sequence and Activity Oriented Method for enhancing Skill of Observation in learning Science among Elementary School Students by considering pre-test as a covariate.

METHODOLOGY IN BRIEF

In the present study, the investigator adopted experimental method to find out the effectiveness of the instructional strategy based on Fibonacci Number sequence on enhancing interest and skill of observation in learning science among elementary school students. The design selected was Quasi-experimental design in which non-randomized control group pre test post test design was used for conducting the study. A sample of 70 students from two divisions of fifth standard of St. Mary's H.S.S Kidangoor, Kottayam was selected for the study in which 35 each was assigned to experimental and control groups. The experimental group was taught through new instructional strategy based on Fibonacci Number sequence and the control group was taught through activity oriented method. The skill of observation and Interest to Learn Science among students in both experimental and control groups were measured before and after giving the experimental treatments.

TOOLS USED FOR THE STUDY

- Lesson package of new instructional strategy based on Fibonacci number sequence.
- Lesson transcripts based on activity oriented method.
- Non-verbal science interest inventory.
- Observation skill test

STATISTICS USED

Arithmetic mean, standard deviation, 't' test, paired 't' test and ANCOVA were the statistical techniques used for the study.

Analysis of Data

Hypothesis 1

To compare the effectiveness of Instructional Strategy based on Fibonacci Number Sequence and Activity Oriented Method for enhancing Interest in learning Science among Elementary School Students by considering pre-test as a covariate.

Table 1
SUMMARY OF ANCOVA RESULT OF PRE-TEST AND POST-TEST SCORES INTEREST IN LEARNING SCIENCE

Source of variance	df	SS_X	SS_Y	SS_{XY}	SS_{YX}	MS_{YX}	SD_{YX}
Among group means	1	38.65	1226.42	217.65	1580.37	1580.37	4.74
Within the groups	67	8987.12	6928.17	6980.65	15.6.02	22.48	

F_{YX}	=	70.30
From the table, for df	=	1, 67
F at 0.05 level	=	3.98

The obtained F ratio is tested for significance. Since the table value of F ratio for df 1,67 is 3.98 at 0.05 level, the calculated value is far greater than the table value. Thus the obtained F_{YX} ratio is highly significant (F_{YX}=70.30; P<0.05). It is clear from the significant F_{YX} ratio that the final means which depend upon the experimental and control variables differ after they have been adjusted for initial differences.

Comparison of Adjusted Y means

The adjusted means for post-test scores (Y) of students in the experimental and control groups are computed using correlation and regression. The difference between the adjusted Y means of post-test scores of students in experimental and control groups is given in table 2.

Research Paper

Table 2
COMPARISON OF DATA FOR ADJUSTED MEANS OF POST-TEST SCORES IN INTEREST IN LEARNING SCIENCE IN EXPERIMENTAL AND CONTROL GROUPS

Group	N	M_X	M_Y	M_{YX} (Adjusted)
Experimental	35	13.91	23.37	23.96
Control	35	15.4	15	14.42
General means		29.31	38.37	

SE_D between the adjusted means	=	1.14
Calculated t value	=	8.37
For df (1, 68), from the table for critical value of t, t at 0.05 level	=	2.00

The t value obtained was 8.37 which is greater than the table value. So it is significant for df 1/68 at 0.05 level. Therefore the obtained value is significant at 0.05 level. The significant t value leads to the conclusion that the two means differ considerably. This implies that the experimental group and the control group differ significantly in their Interest in learning Science. When initial differences are allowed for , the new strategy makes significant changes in final (post-test) scores.

Hypothesis 2

To compare the effectiveness of Instructional Strategy based on Fibonacci Number Sequence and Activity Oriented Method for enhancing Skill of Observation in learning Science among Elementary School Students by considering pre-test as a covariate.

Table 3

SUMMARY OF ANCOVA OF PRE-TEST AND POST-TEST SCORES OF SKILL OF OBSERVATION IN LEARNING SCIENCE

Source of variance	df	SS_X	SS_Y	SS_{XY}	SS_{YX}	MS_{YX}	SD_{YX}
Among group means	1	0.51	1892.8	31.2	2048.63	2048.63	5.38
Within the groups	67	108.74	1306.69	250.14	1882.19	28.09	

F_{YX} = 72.93
From the table, for df = 1, 67
F at 0.05 level = 3.98

The obtained F ratio is tested for significance. Since the table value of F ratio for df 1, 67 is 3.98 at 0.05 level, the calculated value is far greater than the table value. Thus the obtained F_{YX} ratio is highly significant (F_{YX}-72.93; $P<0.05$). It is clear from the significant F_{YX} ratio that the final means which depend upon the experimental and control variables differ after they have been adjusted.

Comparison of Adjusted Y means

The adjusted means for post-test scores (Y) of students in the experimental and control groups are computed using correlation and regression. The difference between the adjusted Y means of post-test scores of students in experimental and control groups is given in table 4.

Table 4

COMPARISON OF DATA FOR ADJUSTED MEANS OF POST-TEST SCORES IN SKILL OF OBSERVATION IN LEARNING SCIENCE IN EXPERIMENTAL AND CONTROL GROUPS

Group	N	M_X	M_Y	M_{YX} (Adjusted)
Experimental	35	3.14	13.11	13.20
Control	35	2.97	2.71	2.41
General means		6.11	15.61	

SE_D between the adjusted means = 1.31
Calculated t value = 8.24
For df (1,68), from the table for critical value of t, t at 0.05 level = 2.00

The t value obtained was 8.24 which is greater than the table value. So it is significant for df (1,68) at0.05 level. Therefore the obtained value is significant at 0.05 level. The significant t value leads to the conclusion that the two means differ considerably. This implies that the experimental group and the control group differ significantly in their Skill of Observation in learning Science. When initial differences are allowed for, new instructional strategy makes significant changes in final (post-test) scores.

CONCLUSION

Above mentioned results indicated that students of experimental group who were taught by new instructional strategy based on Fibonacci Number Sequence showed comparatively better results than that of students of control group who were taught with Activity Oriented Method. So Interest and Skill of Observation in learning science of students in the experimental group was better than that of students of control group.

EDUCATIONAL IMPLICATIONS

In the field of science education new instructional strategy based on Fibonacci Number Sequence is an easy and interesting interdisciplinary method. If this method is given proper attention it helps to maintain better student teacher understanding and relationship, better adaption of teaching learning and greater satisfaction of student with his science learning. New instructional strategy based on Fibonacci Number Sequence emphasis on meaningful learning than mechanical learning.

New instructional strategy makes teaching learning in the classroom meaningful, integrative, value based, challenging and active. This new method enables the teachers to capitalize on the diversity and natural interest of their students in the world around them. This strategy helps the teachers to design learning events that challenge students to make meaningful connection to the mysteries of the nature.

Children taught by new strategy enable them to explore both the process and concepts of science by integrating, knowledge skills, and dispositions with authentic action. The experiences woven through the curriculum which integrates the method should follow logical sequences allow for depth and focus and help the learners to move forward in their acquisition of knowledge and skills. For effective transaction of information through new method requires thoughtful planning along with time and resources.

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Continuation of Page 16

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I, S. Sebastian, hereby declare that the particulars given above are true to the best of my knowledge and belief.

S. Sebastian