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EFFECTIVENESS OF 5E MODEL OF INSTRUCTION IN SCIENCE LEARNING AT ELEMENTARY LEVEL

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ABSTRACT:

Now a days effective classroom instruction and construction of knowledge are very essential in modern education system. This study try to assess the effectiveness of 5E model of instruction on science learning at elementary level. For this study 65 students of class VI (each in control and experimental group) have been taken as sample. The result shows that 5E model of instruction has significant impact on academic achievement of students in science.

KEYWORDS: science learning , modern education system.

INTRODUCTION

Education is vital to the space of social, political and economic development of any nation, so effective classroom instruction and construction of knowledge is very essential. Traditional method relies mainly on text book and emphasize on memorization power. With traditional method of teaching, assessment is seen as a separate activity and occurs through testing while with modern method of teaching (through 5E model of instruction) assessment is seen as an activity integrated with teaching and learning (Brooks and Brooks, 1999). The traditional model of teaching based on objectivist point of view has been shifted towards constructivist view

point with the assumption that knowledge is subjective and children construct knowledge themselves in a joyful environment. Teachers act as a co-creator of knowledge. According to Piaget, Vygotsky children construct knowledge individual based on their previous experience. The 5E model developed in 1987 by the biological sciences curriculum study promotes collaborative, active learning in which students work together to solve problem and investigate new concepts by asking questions, observing, analyzing and drawing conclusion. Each of 5 E's describes a phase of learning and each phase begins with the letter "E": Engage, Explore, Explain, Elaborate, and Evaluate. NCF, 2005 describes situation and opportunities have to be created for students to provide students with challenges

encourage creativity and active participation for students. Students have to be encouraged to intent with peers to form the concept of the given topic. The 5E model of instruction is based on constructivist theory to learning which suggested that people construct knowledge and meaning from experiences. By understanding and reflecting on activities students are able to reconceal new knowledge with previous ideas. In the classroom constructivism requires educators to build inquiry, exploration and assessment into their instructional approach. That means the teacher plays the role of a facilitator, guiding students as they learn new concepts.

OBJECTIVE OF THE STUDY:-

The objectives of the study are as follows:

- 1) To study the impact of teaching of science through 5E model of instruction on academic achievement of the learner of class VI.
- 2) To study the impact of teaching science through traditional instructional method on academic achievement of the learner of class VI.

HYPOTHESIS:-

The study having the following hypothesis

There will be no significant difference between teaching science through 5E model of instruction and teaching science through traditional instructional method on academic achievement of the learner of class VI.

RESEARCH DESIGN:**1) Variable:-**

Independent Variable- Instruction through 5E model, Traditional instructional method.

Dependent Variable- Academic achievement.

2) Population and sample:-

All the students of class VI in secondary school of West Bengal district. Learners of class VI of ten apparently equivalent secondary school of Purba Bardhaman District. Learners of class VI of Tejganj High School were taken as experimental group and learners of class VI of Burdwan Adarsha Vidyalaya (High School) were taken as controlled group. The number of subjects of experimental group and controlled group was 65 and 65 respectively.

3) Tools:-

In the study the investigator used parallel forms of self-made achievement test in subject of science. Each parallel forms of self-developed achievement test (checked and verified by the experts) constitute three parts covering a variety of items

4) Treatment:-

In the present study the investigator took two groups-experimental and controlled group. Both the groups were pretested and their scores were analyzed. After the administration of pretest the treatment was given to experimental group. The students of class VI of Tejganj High School i.e. experimental group were taught by the investigator through 5E model of instruction. The student of class VI of Burdwan Adarsha Vidyalaya (High School) i.e. controlled group were taught by the subject teacher (to avoid carry over effect) through traditional instructional method. The investigator supervised the teaching of the subject teacher. The detail of pretest, treatment and posttest both the experimental and controlled group are discussed in following section.

TABLE1- Design of teaching programme on the science subject and testing both the experimental and controlled groups.

Pretest	Content	Posttest
Achievement test(developed by the investigator) PARTA-Multiple choice type question. PARTB-Open ended value based question. PART C-concept based question.	1. Primary concept of force and energy. 2. Events around our environment. 3. Human body 4. Biodiversity and its classification	Achievement test(developed by the investigator) PARTA-Multiple choice type question. PARTB-Open ended value based question. PART C-concept based question.

PROCEDURE OF DATA COLLECTION:-

The achievement test was applied to controlled group to assess their status just at the beginning of the experiment. On the same day same achievement test was administered to the experimental group. After the pretest controlled group was taught through traditional instructional method by their subject teacher (the lesson plan prepared by the subject teacher were verified by the investigator prior to implementation). From the same day experimental group were taught by investigator through 5E model of instruction. Twenty teaching days were spent to teach all the topics under the respective four chapters. At the end of teaching the posttest was administered to both groups. A minimum gap of 45 days was maintained between the successive administration of pretest and posttest.

STATISTICAL TECHNIQUES APPLIED:-

The collected data was analyzed to test the normality of distribution of data at the pretest level through mean, median, mode, skewness and kurtosis and to test the impact of the independent variable; t-test was applied.

DATA ANALYSIS AND INTERPRETATION:-To consider the nature of distribution of pretest scores on academic achievement of both the controlled and experimental groups; descriptive statistics like mean, median, mode, SD, skewness and kurtosis were calculated.

TABLE 2- Showing mean, median, mode, standard deviation, skewness, kurtosis of control and experimental group.

Groups	N	Mean	Median	Mode	SD	Skewness	Kurtosis
Control	65	43.95	44.5	45.6	13.57	-1.75	0.278
Experimental	65	44.1	44.5	45.3	13.70	-1.75	0.278

It indicates that the values of mean, median and mode of both the groups are very close to each other i.e. distribution is almost normal. The obtained value of skewness and kurtosis are very close to such values needed in case of normal distribution of scores thus investigator may safely conclude that the groups are more or less equivalent in nature. Hence the t-test may be applied to study the significance of difference between the mean of controlled and experimental group.

➤ **Impact of 5E model of instruction on academic achievement of experimental group**

TABLE 3-The following table shows difference of mean score SD and t-value of experimental group at pretest and posttest level.

Test	N	Mean	SD	DF	Calculated t-value	Tabulated t-value	Level of significance
Pre-test	65	44.1	13.70	39	2.36	2.02	0.05
Post-test	65	50.85	11.89				

From the above table it has been found that calculated t-value (i.e. 2.36) is more than tabulated t-value (i.e. 2.02) at 0.05 level of significance. Thus null hypothesis is rejected. It can be said that 5E model of instruction has positive impact upon academic achievement of the learners of class VI.

➤ **Impact of traditional instructional method of teaching on academic achievement of controlled group.**

TABLE 4-The following table shows difference of mean score, SD and t-value of controlled group at pre-test and post-test level.

Test	N	Mean	SD	DF	Calculated t-value	Tabulated t-value	Level of significance
Pre-test	65	43.95	13.57	39	0.15	2.02	0.05
Post-test	65	44.4	13.11				

From the above table it has been found that calculated t-value (i.e. 0.15) is less than tabulated t-value (i.e. 2.02) at 0.05 level of significance. The null hypothesis is accepted. It can be said that traditional instructional method does not have any positive impact on the academic achievement of controlled group.

➤ **Comparative impact of 5E model of instruction and traditional method on academic achievement.**

TABLE 5-The following table shows difference of mean score, SD, and t-value of post-test of controlled and experimental group.

Group	Test	N	Mean	SD	DF	Calculated t-value	Tabulated t-value	Level of significance
Controlled	Post-test	65	44.4	13.11	79	2.31	1.99	0.05
Experimental	Post-test	65	50.85	11.89				

From the above table it has been found that calculated t-value (i.e. 2.31) is greater than tabulated t-value (i.e. 1.99) at 0.05 level of significance. The null hypothesis is rejected. It can be said that 5E model of instruction has significant positive impact than traditional instructional method on the academic achievement of student of class VI of both experimental and controlled group.

FINDINGS OF THE STUDY:-

From the above analyze we can conclude that

- 1) The 5E model of instruction has significant impact on the academic achievement of the learner of class VI.
- 2) The traditional instructional method has no significant impact on the academic achievement of learner of class VI.

Educational implication of 5E Model of instruction:-

1. The 5E model of instruction caused a significantly better constructive of scientific conception.
2. It increased learning outcomes of science lessons.
3. The 5E model of instruction allows educators to create a unique learning experience for learners. Teachers who can incorporate the 5E model of instruction in classroom help students build a strong foundation of knowledge.
4. The 5E model of instruction is an inquiry based model. It is Students-led, with the teacher acting mainly as facilitator.
5. Though open-ended questions, real-life experiences, guided investigations, hands-on projects and research, learners gain a deep understanding of scientific topics. Each stage of model serves as a foundation to the next, creating a coherent model that frames lessons, activities and units.
6. With the help of 5E model of instruction learners work out their own solutions to the problems presented, they are not just learning specific materials, they are learning how to learn. They are prepared to navigate in the real world.

CONCLUSION:-

At last it can be said that science is a subject that can be better understood by active engagement of learners. Traditional method of instruction can't create any remarkable difference on academic achievement of students of class VI. 5E model of instruction used for VIth standard students for science teaching was found to be very effective as far as the academic achievement of students.

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