

Impact of Constructivistic ICT Module of VIII Standard Students in Learning Science

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Abstract

Constructivist approach is important for reaching the goals of teaching learning process. It emphasizes the learning is not simply an activity, which can be taught to the learner. The learner learns or rather construct knowledge through experiences. The study aimed to determine the impact of Constructivistic ICT module of VIII standard students in learning science. The total sample (168) of the study includes (81) control group, (87) experimental group respectively, they were selected through purposive cluster sampling technique. The researcher developed “Constructivistic ICT module” based on the principles of Yager model (1991) steps follows as starting the lesson, continuing the lesson, proposing explanations and solutions and follow up. Achievement test was constructed by the researcher and pretest was conducted for both the groups to know the entry level knowledge of the students. Experimental group was taught through Constructivistic ICT module and control group was taught through conventional method. After the treatment post test were administered to both the groups. After the gap of three months retention test was administered to both the groups to find out the retention. Students’ achievement in science of experimental group on posttest, retention test, gain ratio and retention ratio was significant over that of control group. The overall findings showed that constructivistic ICT module were more effective when compared to conventional method in learning science.

KEYWORDS: Constructivistic ICT module, conventional method, Achievement in learning science

Introduction

Constructivism is an epistemology, a learning or meaning-making theory that offers an explanation of the nature of knowledge and how human beings act to current learning methodology. It maintains that individuals can construct their own way of learning, understanding and inculcate knowledge through the interaction of what they already know and believe and the ideas, events and activities with which they come in contact (Canella & Reilf, 1994; Richardson, 1997). Knowledge is acquired through involvement with content instead of imitation or repetition (Kroll & LaBoskey, 1996). Learning activities in constructivist setting are characterized by active engagement, inquiry, problem solving, and collaboration with others. Rather than a dispenser of knowledge, the teacher is a guide, facilitator, and co-explorer who encourage learners to question, challenge and formulate their new ideas, opinions, and conclusions.

Need and significance of the study

Schools are expected to transmit knowledge to younger generations. The traditional classroom sometimes resembles a single person show with a captive but often uninvolved audience. Classes are usually dominated by teacher-centered approach and heavily

depend on textbooks for the content of the course. Information and instruction are separated into parts that make up a whole concept. In the traditional teaching process modest room for student-initiated questions, they cannot participate, think or interact between students. To improvise the instruction, various strategies like discovery learning, joyful learning, and recently experimental learning were introduced. The experimental learning is valuable and has been shown to improve motivation for learning, but it does not guarantee the construction of knowledge that is required in the real world. Hence it requires a shift from teacher-centered to learning-centered education. One of the proposed solutions can be “Constructivist approach”.

Constructivism is a central idea in which constructivist learning is “constructed” that learners build new knowledge upon the foundation of previous learning. Each Individuals construct their own knowledge (a local notion) while accepting the existence of objective knowledge (a global notion). The researcher wants to integrate the technology into constructivist approach. The educational system around the world is under increasing pressure to use the new information and communication technology to teach students the knowledge and skills. ICT is used to change the sensory focus of the students and their creative thinking. Hence the researcher integrates constructivist approach and ICT. In Constructivist approach, teachers facilitate learning by encouraging active inquiry, guiding learners to question their tacit assumptions, and coaching them in the construction process. The concept of situated learning that “knowledge is created and made meaningful by the context in which it is acquired” is embedded in constructivism. The National Curriculum Framework (NCF-2005) also recommends that curriculum should help learners to become constructors of knowledge and emphasized the active role of teachers in relation to the process of knowledge construction. Hence the investigator has made an attempt to study the “Impact of Yager (1991) Model of Constructivistic ICT Module of VIII standard students in learning science”.

Operational definitions of the key terms used

Impact

In the study, impact is described as significant mean difference of a group over the other group on posttest and retention test in terms of students’ achievement in science. In this fashion, the group having high mean score is called greater ‘impact’ than the other group.

Constructivist approach

In the constructivist perspective, learning is a process of construction of knowledge. Learners actively construct their own knowledge by connecting new ideas to existing ideas on the basis of material/ activities presented to them. The structuring and restructuring of ideas are essential features as the learner’s progress in learning through ICT module in learning science.

ICT Module

In the present study the researcher refers Information Communication Technology engaging a variety of media, including text, audio, video, graphics and animation, either separately or in combination with computers to communicate ideas or to disseminate information.

Conventional method

A teacher centered conventional method of teaching with a due weight-age to talk and chalk, given to class VIII chemistry text-book of Tamil Nadu under the Equalization of Education Syllabus.

Objectives of the study

- To develop an ICT module for adopting the Constructivist approach based on the principles of Yager model (1991) for VIII standard students in learning science.
- To find out the impact of conventional method and Constructivistic ICT module based on the principles of Yager model (1991) for VIII standard students in learning science.

Hypotheses

- There is a significant difference between the control and experimental group of VIII standard student's achievement in learning science

Population

All the students of class VIII of Tamil medium Government, government aided and private schools of Dindigul district for the academic year 2013-14 following the Equitable Education State Board Syllabus were constituted the population for the study.

Sample & sampling techniques

Eighth standard students, government school (44), government aided (58) and private school (66) in Dindigul district were taken as a sample for the study. The researcher was adopted purposive cluster sampling method in selecting the samples. In this manner the selection and the assignment of the students were performed into two groups; Experimental group (87) and Control group (81).

Experimental design

Since the nature of the present study was Experimental. For this purpose the pretest- posttest quasi equivalent group design was selected.

Procedure of the study

The pretest was administered on the students in order to know their entry level performance. The groups were assigned to one control and another experimental group. The researcher selected the chemistry lesson coal and petroleum comes under Equitable Education syllabus in VIII standard science subject and developed the ICT module integrate with Yager model (1991) based on the principles of constructivist approach. The experimental group was taught using Constructivistic ICT Module while the control group was taught using conventional method. The experiment had been continued for 6 weeks. After the treatment, posttest was administered to both the groups. The same test was administered to find out the retention after an interval of three months.

Research tools

The achievement test for coal and petroleum includes 25 multiple choice items which squeeze 9 questions on Knowledge, 4 questions on understanding, 7 Application and 5 skill based questions were framed by the researcher according to the Bloom's Taxonomy of Cognitive Objectives. The achievement test was constructed based on a pre defined blue print. Achievement test were administered as pre

test, posttest and retention test for VIII standard students to know the impact in learning science.

Validity and Reliability of the tool Content validity was established by the subject experts in the field of chemistry and science education for the Constructivistic ICT module and the achievement test in chemistry “Coal and Petroleum” for VIII standard. There by the face validity of the achievement test was established. Cronbach alpha coefficient reliability was established and it was found that 0.734.

Variables under the study

Independent variables: Approaches of teaching science i.e. Constructivistic ICT module and conventional method.

Dependent variables: VIII standard students’ achievement in science

Delimitations of the study

- ❖ The present study was confined to eighth standard students in the selected higher secondary schools.
- ❖ One lesson in chemistry “Coal and Petroleum” for eighth standard were only taken for experimental research
- ❖ State board Tamil medium students were alone taken for this research
- ❖ Equitable Education state board syllabus is also considered

Analysis and interpretation of data

In analysis the collected data were tabulated and statistical techniques were employed as per research design of the study.

Hypothesis: 1

This hypothesis was tested by calculating mean, standard deviation and P’value. The means, standard deviation and P’value are given in the table 1 below:

TABLE: 1

Mean difference between the control and experimental group of VIII standard student’s achievement in learning science

Achievement in Learning science	Group	Mean	SD	“t” value	“P” value
Pretest	Control	11.09	3.909	2.419	0.175
	Experiment	12.39	3.055		
Posttest	Control	16.27	4.162	5.022	< 0.001**
	Experiment	19.26	3.555		
Retention test	Control	16.47	4.618	6.080	< 0.001**
	Experiment	20.46	3.878		
Gain ratio	Control	39.66	19.14	5.813	< 0.001**
	Experiment	57.37	20.26		
Retention ratio	Control	101.78	16.14	2.284	< 0.001**
	Experiment	106.57	10.62		

Note: ** denotes significance at 1% test

It is inferred that the “P” value is less than 0.01 and hence the hypothesis is accepted at 1% level. This indicates that significant difference was found between control and experimental group in terms of their achievement in science on posttest, retention test, gain ratio and retention ratio.

Discussion of the results

In this study, significance difference was found between the control and experimental group of tenth standard students in learning science. Based on the mean scores of the post test, retention test, gain ratio and retention ratio of the students achievement in learning science through constructivistic ICT module was found to be high in the experimental group when compared to control group.

The findings showed that constructivistic ICT module significantly contributed towards the achievement of learning school science. Constructivist approach is otherwise called meaning making theory that offers an explanation of the nature of knowledge and how human beings act to current learning methodology. It maintains that individuals create or construct their own way of learning, understanding and inculcate knowledge through the interaction of what they already know and believe the ideas, events and activities with which they come in contact (Canella & Reilf 1994, Richardson 1997). This reveals that learning through constructivist approach is enhanced well than through the conventional method. Hence Yager model (1991) based on constructivistic ICT module had meaningful learning, students constructs their knowledge through the learning experiences which has been provided in the description of the module. This reveals that learning through constructivist approach the students acquired knowledge more easy than the conventional method. It will leads to lifelong learning.

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