EFFECTIVENESS OF INTERPRETATION CONSTRUCTION MODEL (ICON) ON CLASSROOM PROCESS AND LEARNING ACHIEVEMENT OF CLASS VII STUDENTS IN SCIENCE

A

Dissertation

Submitted

to

Barkatullah University, Bhopal

In partial fulfilment of the requirement for the Degree of

MASTER OF EDUCATION

Regional Institute of Education, Bhopal

Session: 2012-13

विद्यया ऽ मृतमश्नुते

एन सी ई आर टी
NCERT

Supervisor:

Prof. H.K. Senapaty

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RIE, Bhopal

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Deepti Jadia

M.Ed.

REGIONAL INSTITUTE OF EDUCATION

(A Constituent Unit of National Council of Educational Research and Training, New Delhi

SHYAMLA HILLS, BHOPAL (M.P.)

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SHYAMLA HILLS, BHOPAL (M.P.)

DECLARATION

I hereby declare that the dissertation entitled, "EFFECTIVENESS OF INTERPRETATION CONSTRUCTION MODEL (ICON) ON CLASSROOM PROCESS AND LEARNING ACHIEVEMENT OF CLASS VII STUDENTS IN SCIENCE" has been carried out by me during the academic year 2012 – 2013 in partial fulfillment of the requirement for the degree of maters of requirement for the degree of Maters of Education of Barkatullah University, Bhopal, M.P.

This study has been conducting under the guidance and supervision Prof. Hrushikesh Senapaty, Principal of Regional Institute of Education, Bhopal, M.P.

I also declare that the research work done by me is original and natural. This dissertation has not been submitted before other by me or by any other, for the award of any degree or diploma in any university.

Jadia

Place: Bhopal, M.P. DEEPTI JADIA

Date : 08.05.13

CERTIFICATE

This is to certify that Miss Deepti Jadia, Student of Master of Education, (R.I.E.) course of Regional Institute of Education N.C.E.R.T. Bhopal, M.P. for the academic year 2012 – 2013 has conducted a research work entitled "EFFECTIVENESS OF INTERPRETATION CONSTRUCTION MODEL(ICON) ON CLASSROOM PROCESS AND LEARNING ACHIEVEMENT OF CLASS VII STUDENTS IN SCIENCE" under my supervision.

It is her genuine work and I consider it worthy of submission for the award of the degree.

Date : 8-5-2013

Place : Bhopal, M.P.

Prof. H.K. Senapaty
Principal
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INTRODUCTION

1.0 The Context

Modern educational theory has stressed learners' active participation in learning. A major contribution of educational research during this century has been its focus on the processes that learner use , more than on the material to be learned.

Constructivism is basically a theory -- based on observation and scientific study -- about how people learn. It says that people construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences. When we encounter something new, we have to reconcile it with our previous ideas and experience, maybe changing what we believe, or maybe discarding the new information as irrelevant. In any case, we are active creators of our own knowledge.

To do this, we must ask questions, explore and assess what we know. In the classroom, the constructivist view of learning can point towards a number of different teaching practices. In the most general sense, it usually means encouraging students to use active techniques (experiments, real-world problem solving) to create more knowledge and then to reflect on and talk about what they are doing and how their understanding is changing. The teacher makes sure she understands the students' pre-existing conceptions, and guides the activity to address them and then build on them.

Constructivist teachers encourage students to constantly assess how the activity is helping them gain understanding. By questioning themselves and their strategies, students in the constructivist classroom ideally become "expert learners." This gives them ever-broadening tools to keep learning. With a well-planned classroom environment, the students learn how to learn.

1.1 Constructivism and Classroom

As is the case with many of the popular paradigms, teachers are already using the constructivist approach to some degree. Constructivist teachers pose questions and problems, and then guide students to help them find their own answers. They use many techniques in the teaching process. For example, they may:

1. prompt students to formulate their own questions (inquiry)
2. allow multiple interpretations and expressions of learning (multiple intelligences)
3. encourage group work and the use of peers as resources (collaborative learning)
4. The primary goal of constructivist approach is to helping students: learn how to learn.In a constructivist classroom, learning is . . . constructed.

Students are not blank slates upon which knowledge is etched. They come to learning situations with already formulated knowledge, ideas, and understandings. This previous knowledge is the raw material for the new knowledge they will create. Students control their own learning process, and they lead the way by reflecting on their experiences. This process makes them experts of their own learning.

The teacher helps to create situations where the students feel safe questioning and reflecting on their own processes, either privately or in group discussions. The teacher should also create activities that lead the student to reflect on his or her prior knowledge and experiences. Talking about what was learned and how it was learned is really important.

The constructivist classroom relies heavily on collaboration among students. There are many reasons why collaboration contributes to learning. The main reason it is used so much in constructivism is that students learn about learning not only from themselves, but also from their peers. When students

review and reflect on their learning processes together, they can pick up strategies and methods from one another.

1.2 History of Constructivism

"As long as there were people asking each other questions, we have had constructivist classrooms. Constructivism , the study of learning , is about how we all make sense of our world, and that really hasn't changed". JacquelineGrennanBrooks(1999)

Concept to Classroom Interview

The concept of constructivism has roots in classical antiquity, going back to Socrates's dialogues with his followers, in which he asked directed questions that led his students to realize for themselves the weaknesses in their thinking. The Socratic dialogue is still an important tool in the way constructivist educators assess their students' learning and plan new learning experiences.

In this century, Jean Piaget and John Dewey developed theories of childhood development and education, what we now call Progressive Education that led to the evolution of constructivism. Piaget believed that humans learn through the construction of one logical structure after another. He also concluded that the logic of children and their modes of thinking are initially entirely different from those of adults. The implications of this theory and how he applied them have shaped the foundation for constructivist education.

Dewey called for education to be grounded in real experience. He wrote, "If you have doubts about how learning happens, engage in sustained inquiry: study, ponder, consider alternative possibilities and arrive at your belief grounded in evidence." Inquiry is a key part of constructivist learning.

Among the educators, philosophers, psychologists, and sociologists who have added new perspectives to constructivist learning theory and practice are Lev Vygotsky'Jerome Bruner, and David Ausubel.Vygotsky introduced the social aspect of learning into constructivism. He defined the "zone of

proximal learning," according to which students solve problems beyond their actual developmental level (but within their level of potential development) under adult guidance or in collaboration with more capable peers.

Bruner initiated curriculum change based on the notion that learning is an active, social processes in which students construct new ideas or concepts based on their current knowledge. SeymourPapert's groundbreaking work in using computers to teach children has led to the widespread use of computer and information technology in constructivist environments. Modern educators who have studied, written about, and practiced constructivist approaches to education include John D.Branford · Ernst von Glasersfeld,Eleanor Duckworth, George Forman, Roger Schank, Jacqueline Grennon Brooks, and Martin G. Brooks.

1.3 Some Critical Perspectives

Constructivism has been criticized on various grounds. Some of the charges that critics level against it are:

1. Its elitist. Critics say that constructivism and other "progressive" educational theories have been most successful with children from privileged backgrounds who are fortunate in having outstanding teachers, committed parents, and rich home environments. They argue that disadvantaged children, lacking such resources, benefit more from more explicit instruction. In this context ED.Hirsch said " In truth,progressivism didn't work with all 'priviledge' kids,just those who had advantages at home or were smart enough to do discovery learning"
2. Social constructivism leads to "group think." Critics say the collaborative aspects of constructivist classrooms tend to produce a "tyranny of the majority," in which a few students' voices or interpretations dominate the group's conclusions, and dissenting students are forced to conform to the emerging consensus.
3. There is little hard evidence that constructivist methods work. Critics say that constructivists, by rejecting evaluation through testing and other external criteria, have made themselves unaccountable for their students' progress.

Critics also say that studies of various kinds of instruction -- in particular Project Follow Through, a long-term government initiative -- have found that students in constructivist classrooms lag behind those in more traditional classrooms in basic skills.

Constructivists counter that in studies where children were compared on higher-order thinking skills, constructivist students seemed to outperform their peers.

1.4 Benefits of Constructivism

1. Children learn more, and enjoy learning more when they are actively involved, rather than passive listeners.
2. Education works best when it concentrates on thinking and understanding, rather than on rote memorization. Constructivism concentrates on learning how to think and understand.
3. Constructivist learning is transferable. In constructivist classrooms, students create organizing principles that they can take with them to other learning settings.
4. Constructivism gives students ownership of what they learn, since learning is based on students' questions and explorations, and often the students have a hand in designing the assessments as well. Constructivist assessment engages the students' initiatives and personal investments in their journals, research reports, physical models, and artistic representations. Engaging the creative instincts develops students' abilities to express knowledge through a variety of ways. The students are also more likely to retain and transfer the new knowledge to real life.
5. By grounding learning activities in an authentic, real-world context, constructivism stimulates and engages students. Students in constructivist classrooms learn to question things and to apply their natural curiosity to the world.
6. Constructivism promotes social and communication skills by creating a classroom environment that emphasizes collaboration and exchange of ideas. Students must learn how to articulate their ideas clearly as well as to

collaborate on tasks effectively by sharing in group projects. Students must therefore exchange ideas and so must learn to "negotiate" with others and to evaluate their contributions in a socially acceptable manner. This is essential to success in the real world, since they will always be exposed to a variety of experiences in which they will have to cooperate and navigate among the ideas of others.

1.5 Interpretation Construction Design Model (ICON)

According to John Black and Robert McClintock (1995), a model of constructivist teaching called ICON (Interpretation Construction design Model)proposes that throughout the activities, students need to be encouraged to make valid observations that are grounded in fact they need to interpret these observation and construct valid arguments of support that rely on background knowledge and contextual information. Part of this process must occur through collaboration between teacher and student as well as between students and peers students must also the allowed to "gain cognitive flexibility" by living exposed to multiply interpretations of the information to which they are being exposed and they must be able to assimilate it to a degree that they are comfortable in transferring that information to others (Black &McClintock, 1995; Hein 1991)

This methodology is supported by studies on "brain -based" learning theory, a theory that investigates how the brain develops, acquires & retains information. According to "Brain- based" learning theory, in order for students to gain a true understanding of a topic, they must be active participants in their own learning "The teacher is not the deliverer of knowledge, but the facilitation and intelligent guide who engages student interest in learning (Cain &cain 1997). Students only construct knowledge according to their developmental stage & their pre-existing knowledge base. ICON reflects how cognitive psychology technology and constructivism can be integrated into instructional activities. There are seven steps to the ICON model (Black &McClintock, 1995, Para, 2)

1. Observation-Students make observations of authentic artefacts anchored in authentic situations.

2. Contextualization: Students access background and contextual materials of various sorts to aid interpretation and argumentation.

3. Cognitive apprenticeship: Students serve as apprentices to teachers to master observation, interpretation and contextualization.

4. Collaboration: Students collaborate is observation interpretation and contextualization.

5. Interpretation Construction: Students construct interpretation of observations and construct arguments for the validity of their interpretations.

6. Multiple Interpretations: Students gain cognitive flexibility by being exposed to multiple interpenetration.

7. Multiple Manifestations: Students gain transferability by seeing multiple manifestations of the same interpretations.

The ICON model is appropriate for larger instructional projects which contain the level of complexity and the necessary time to adequately engage in each of the steps. Smaller assignments would probably require deleting the cognitive apprenticeship step due to time constraints.

1.6 Justification of the Study

Constructivist teaching is based on the belief that learning occurs as learners are actively involved in a process of meaning and knowledge construction rather than passively receiving information. Learners are the makers of meaning and knowledge. Constructivist teaching fosters critical thinking and creates motivated and independent learners. In constructivism there are many types of models. The present study the researcher has focused on ICON model, which reflects how cognitive psychology, technology and constructivism can be integrated into instructional activities. The ICON model has seven steps which are observation, contextualization, cognitive apprenticeship, collaboration, Interpretation construction, multiple interpretations, and multiple

manifestations. These steps help the learner to construct their own knowledge. As the science subject requires ability of keen observation, critical thinking, problem solving and multiple interpretation etc. The researcher feels that this method helps the learner in developing those qualities.

1.7 Statement of the Problem

The present study seeks answers to such questions as

i) whether there exists any effect of ICON model of constructivist approach in terms of achievement in science of students of class VII.
ii)whether there exist any effect of ICON model of constructivist approach and Level of Achievement and their Interaction on Students' Achievement in Science.

iii) The Reaction of teachers and students towards ICON Model.

The above questions constituting the problem of the present study have been investigated under the title
"Effectiveness of Interpretation Construction Model on classroom process and learning achievement of class VII students in science".

1.8 Operational Definition

The terms used in study can be operationally defined as follows

1. **Constructivism:** Constructivism is a student-centred approach that places responsibility on students to take charge of their learning experiences. Teachers create activities and assignments that foster the creation of knowledge. Students are challenged to produce reality based products such as portfolios and papers.

2. **Science Achievement Test:** It is the test of science used to measured the achievement of students after the treatment.

3. **Instructional Construction Model (ICON):**ICON reflects how cognitive psychology technology and constructivism can be integrated into instructional activities. It was developed by Black &McClintock, 1995. There are seven steps in ICON model these steps are observation,contextualization,cognitive apprenticeship, collaboration, Interpretation construction, multiple interpretation, and multiple manifestation.

1.9Objective of the Study

The following objectives are framed for the study.

1.To study the effectiveness of the ICON model of constructivist approach in terms of achievement in science of students of class VII.

2.To study the effect of ICON model of constructivist approach and Level of Achievement and their Interaction on Students' Achievement in Science.

3.To study the Reaction of teachers and students towards ICON Model.

1.10 Hypotheses

i)Students taught through ICON Model will gain significantly higher scores as compared to their counter parts in their control group.

ii)There will be no significant effect of Teaching Strategy on students' Achievement in Science.

iii)There will be no significant effect of Levels of Achievement on the students' Achievement in Science.

iv)There will be no significant Interaction of Teaching Strategy and Levels of achievement on students' Achievement in Science.

1.11 Delimitations

In view of the research constraints under which the study was conducted it remained confined to the following:

i .The CBSE syllabus of class VII science only.

ii. Demonstration Multipurpose school Bhopal.

iii.Only10 days treatment was given.

iv.Only10 lesson plans were taught .

v. Only one chapter was taught.

CHAPTER II

REVIEW OF RELATED LITERATURE

CHAPTER -II

REVIEW OF RELATED LITERATURE

2.0 Introduction

This chapter deals the review of those related literature which directly or indirectly related to the study proposed by the researcher. A careful review of the research journals, books, dissertation thesis and other resourceful information on the problem to be investigated is one of the important steps in planning of any research so that the researcher can find the directions for Pre-request to plan of study, Avoid duplication, Source of problem of study, Finding gaps, Clear pictures of the problem, Determining meaning and relationship among variables.

2.1 Studies Related to Constructivist Approach

Pritinanda (Jan 2013), conduct study on students' perception on collaborative learning A strategy for learning English. Analysis revealed that most students claim to have derived academic benefits such as better comprehension and improved performance and acquired generic skills – enhanced communication . most of the students believe they gained social skills: they found collaborative learning enjoyable . most students agree, that collaborative learning practices should be encouraged and continued. It was concluded that students perception of collaborative learning is positive and accepted by students at secondary level.

Deepa ,Sadananthan (2012) conducted study on Attitude of secondary school teachers towards cooperative learning.

Findings:

i) In the total sample of 180 teachers 45.6%(N=82 total mean 99.9) of teachers showed favorable attitude towards cooperative learning.

ii) Age, sex, locality, subject of teaching experience had strong influence on the attitude towards cooperative learning.

iii)Educational qualification of teachers had no influence on their attitude towards cooperative learning.

Furtak,Seidel,Briggs (2012) conducted study on Experimental and Quasi Experimental studies of Inquiry Based science teaching: A Meta analysis. Their findings revealed that

i) A positive effect of this teaching approach on student learning , with a particularly large effect of students engaging in the epistemic domain of inquiry and the procedural , epistemic and social domains combined.

ii) Meta analysis also indicates higher effect sizes for studies that involved teacher led activities.

iii) Extending beyond the domain of inquiry based teaching , this meta analysis has illustrated how a refined model for instructional approach can yield more nuanced interpretation of the effects of that approach on student learning.

Adlak (2010-11): conducted a study to effectiveness of constructivist approach for teaching English class 6^{th} in terms of achievement.

Findings:

1) Constructivist approach was effective in terms of students' achievement in English.

2) Gender did not produce any differential effect on the achievement in English

3) There was no significant effect of learning on the students' achievement in English.

4) There was no interaction effect of treatment and styles of learning on the students' achievement in English.

Prasad, (2009), Journal of teacher education and research A comparative study of achievement in biological science through traditional method and inquiry training model (ITM .From the analysis and interpretation of data it is found that ITM model is worth applying in different school for teaching biology.

Jayapraba(2009),Journal of teacher education and research. Metacognition instruction and achievement in science classroom .There studies revealed that metacognition instruction were most effective in the experimental group in enhancing academic achievement than in control group.

Makwana. (2007) conducted a study to find the influence of constructivist approach on achievement of class 5^{th} students in Geometry. The main objectives were 1) to study the influence of constructivist approach on achievement of class 5^{th} students in geometry. 2) To find out the difference between private schools and government school in achievement of class 5^{th} students in geometry. 3) To find out the gender wise difference on achievement of class 5^{th} students in geometry.

Findings

1) Teaching and learning process through constructivist learning situation could definitely help students.

2) There were significant increase in the post test scores of both boys and girls.

3) The intensity of improvement of government school student due to the intervention of constructivist approach.

4) Constructivist learning situation improved constructivist approach on achievement of class 5^{th} student in geometry of private and government school.

Patil (2006): The study has investigated into in teaching English the achievement in English language of class 6^{th} students studying through structural approach and compares its achievement with traditional approach, which is currently used in the classroom. As the study intended to see the relative effectiveness of traditional approach and structural approach on the

achievement of 6th class students in English language, researchers adopted two group experimental designs.

The overall achievement of the students studying through structural approach is significantly higher than traditional approach.

Care Stenger and Benadette Garfinkel (2003) How the constructivist approach to learn can be used to attain academic standards. The findings of this project showed all the students had responded well to the constructivist approach to learning. The students were able to work through their problem together. An important one being the openness to conversation in the classroom

Khare (1986) conducted a study entitled ''Traditional and Structural approaches of teaching English with reference to learning outcomes''. The objectives of the study were to test the general level of performance of junior high school students in various aspects of English, namely, spelling, comprehension, applied grammar and vocabulary, (ii) to make the comprehensive study of the average performance of the students taught through the structural approach and traditional approach. Sample of the study comprised of 253 boys and 300 girls from four districts in U.P. seven achievement tests for seven different dimensions of English were constructed. The following conclusions were drawn: (1) the students' achievement under the structural approach was better than those under the traditional method in the areas of spelling, pronunciation and applied grammar

2.2 Studies Related to Achievement in Science

Gaude(2012) conducted a comparative study of multimedia approach and traditional approach on the achievement in science of grade 8th students with different learning styles.

This study has investigated into in teaching science. The achievement in science of class 8th students studying through multimedia approach and

compare its achievement with traditional approach which is currently used in the classroom as the study intended to see the relative effectiveness of the traditional approach and multimedia approach on the achievement in science.

Objectives:

1) To identify the different learning styles of grade 8th students.

2) To compare the achievement in science of grade 8th students taught by multimedia approach and traditional approach.

3) To compare the achievement in science of grade 8th boys taught by multimedia approach and traditional approach.

4) To compare the achievement in science of grade 8th girls taught by multimedia approach and traditional approach.

5) To compare the achievement in science of grade 8th visual learner taught by multimedia approach and traditional approach.

6) To compare the achievement in science of grade 8th auditory learners taught by multimedia approach and traditional approach.

7) To compare the achievement in science of grade 8th tactile learners taught by multimedia approach and traditional approach.

Padmanabham(2005)studied on effectiveness of constructivist approach 2005 on the achievement and problem solving ability in science of vii std students. Her study shows positive effect on the achievement of students in science.

Udovic, Morris, Dickman, Postlethwait &Wetherwax, (2002). Workshop Biology: Demonstrating the effectiveness of Active Learning in an Introductory Biology Course. BioScience, 52(3), 272-281.The article describes a program designed for increasing science literacy rates among non-majors of science at the University of Oregon.
Findings are discussed in brief, but it is shown that inquiry-based instructional strategies did aide student learning.

Switzer& Shriner, (2000). Mimicking the Scientific Process in the Upper-Division Laboratory. BioScience, 50(2), 157-162.In this article two professors of an introductory biology courses discuss the implementation and assessment of inquiry-based learning strategies in their large lecture classrooms and associated labs. They present an argument that supports claims of researchers who suggest that the inclusion of such strategies aides student understanding of course content.

Black and McClintok (1999) stress the importance of interpretation as being central to cognition and learning. Their design of Study Supported Environments (SSEs) based on constructivist design principles called Interpretation Construction Design (ICON) focused mainly on the interpretive construction of authentic artifacts in the context of rich background materials, and spanning across different fields of study. Their study showed that in addition to learning specific content, students were able to acquire generalizable interpretation and argumentation skills.

Sutcliffe, Codgell, Hansel, &McAteer, (1999). Active Learning in a Large First Year Biology Class: a Collaborative Resource-based Study Project on AIDS inScience and Society. Innovations in Education and Training, 36(1), 53-64.

The authors provide a descriptive assessment of the implementation of a inquiry-based (i.e. "resource-based") student projects, and Alternative perspectives are discussed. Both students and tutors of the Program enjoyed the program; and, student work was found to be acceptable when examined using pre-intervention standards.

Lord, (1998). Cooperative Learning that Really Works in Biology Teaching: Using Constructivist-Based Activities to Challenge Student Teams. The American Biology Teacher, 60(8), 580-588.This paper offers guidance in the development of constructivist, inquiry-based activities within classes utilizing team learning. A review of relevant literature offers advice regarding the use of constructivist approaches for teaching in biology,

cooperative learning, the development of useful inquiry-sensitive curricula, the management of cooperative learning, and the grading of cooperative learning tasks. Of note, useful lecture questioning strategies are discussed.

Ebert-May, Brewer, & Allred, (1997). Innovation in Large Lectures - Teaching for Active Learning.BioScience, 47(9), 601-607. The authors describes results of a study designed to test the affects of the inclusion of peer instruction strategies upon student understanding within large lecture introductory biology course. It was found that the implemented strategies aided student understanding and learning, as measured by performance on standardized assessments between control and experimental groups at two public universities.

Lunsford & Herzog, (1997). Active Learning in Anatomy and Physiology: Student Reactions & Outcomes in a Nontraditional APCourse. The American Biology Teacher, 59(2), 80-84.

Informally, the article reviews the work of the investigators in the Teaching of anatomy and physiology. In summary they have found inquiry-based strategies, if properly implemented in the classroom, are not a detriment to future Allied Health students when they take licensing exams. Also, students favour the inclusion of such learning strategies.

Lord ,(1997). A comparison between traditional and constructivist teaching in college biology innovative higher education, 21(3),197-216. the finding of a study that assessed the learning of identical course content in two individual group treatments. One group receiving traditional instruction (n=86) & another receiving student centered constructivist instruction. It is found that the constructivist treated group out preformed the traditionally taught cohort on identical evaluation

Groccia, & Miller, (1996). Collegiality in the Classroom: The Use of Peer Learning Assistants in Cooperative Learning in Introductory Biology. Innovative Higher Education, 21(2), 87-100.The article summarizes the findings of a study that assessed the efficacy of peer learning assistants (PLAs) in an introductory college biology course, and student attitudes concerning the employed assistants and the peer learning groups that the students participated in. It is discovered that students, as well as the PLAs and faculty benefited from the instructional practice. Also discussed is the

development of the specific cooperative learning model employed in the study. Overall, students, faculty, and the PLAs were satisfied with the method.

2.3 Studies Related to Achievement in Geography

Yasmeen Bano (2010) conducted a study on comparison of constructive approach with traditional approach of teaching geography to class 9th in terms variables related to cognitive and effective domain. Findings of the study were: Effectiveness of the constructive approach was studied in terms of the students' achievement in geography and the students' reaction towards the approach. **The findings are as follows**: a) Constructivist approach was effective in terms of students' achievement in geography. b) Constructivist approach was effective in terms of students' reaction towards the approach.

Windschitl (2002) Classroom teachers are finding the implementation of constructivist instruction far more difficult than the reform community acknowledges. This article presents a theoretical analysis of constructivism in practice by building a framework of dilemmas that explicates the conceptual, pedagogical, cultural, and political planes of the constructivist teaching experience. In this context, "constructivism in practice" is a concept situated in the ambiguities, tensions, and compromises that arise among stakeholders in the educational enterprise as constructivism is used as a basis for teaching. In addition to providing a unique theoretical perspective for researchers, the framework is a heuristic for teachers, providing critical questions that allow them to interrogate their own beliefs, question institutional routines, and understand more deeply the forces that influence their classroom practice

2.4 Studies Related to Instructional Material

Shah (1981) conducted a study to develop and try out programmed material in mathematics for student of class V. the main objectives were: 1) to develop programmed materials on various units of the mathematics syllabus of class V and 2) to try out the same on children of class V from the selected

schools. The findings of the study were: 1) programmed material on the selected units was effective and 2) the reaction of the student and the teacher was favourable.

Bhagwat (1992) studied related to prepare a package of divergent production type problems in mathematics and to study the effectiveness of the package against level of intelligence and sex difference for standard VII students. **The main objectives were:** 1) to prepare different production type problems on the standard VII mathematics syllabus in Maharashtra State, 2) to test the effectiveness of package against the level of intelligence for standard VII students and 3) to test the effectiveness of package against the sex differences of standard VII students. An incidental sample of 50 students (25 boys and girls) was chosen for the study. A similar procedure was followed for the main study sample was divided into two groups of 50 each on the basis of level at intelligence. The tools used to collect data included, a standardized test measuring creativity in Mathematics, Ravens' Progressive Matrices, a package of divergent production type problem prepared by the researcher. The experiment was conducted using the pre test, post group design. The data were analyzed by using correlated 't' test and analysis of co-variance.

The major findings were:

1) There was a significant increase in the post test scores in the case of both boys and girls.

2) taking into consideration the three levels of intelligence, it was found that there was a significant increase in the post test scores in the case of both boys and girls.

2.5 Critical Appraisal

Several studies have been conducted to verify the effectiveness of constructivist approach for learning in the classroom. As mentioned in the review of related literature to constructivism it has been observed that

constructivism of teaching and learning is not only effective but also one of the most appropriate methods of teaching.

The approach contributes to critical and radical thinking among students as observed in Black and McClintock (1999) work with ICON Model where the study shows that students had developed argumentation skills after the treatment. It allows the learner in the most natural way.

The approach also develop problem solving ability and inquiry based learning in students as this can be observed in Padmanabhan (2005), Switzer and Shriner (2000), Lord (1998) .

The constructivist approach also contributes to the development of social interaction, communication skills, and social adjustment among the students. To some extend it improves the learning ability of the students as in collaborative learning; they learn from each other and improve. At times the self learning also takes place in the process. This can be observed in the Pritinanda's work.

Constructivist approach also develop the ability of contextualization among the students as revealed by the studies done by Windschitl(2002) in Geography, Makawana (2007) in Geometry, Khare (1986) in English.

One must work on the weakness of the approach as it is difficult to find the negative interpretation about the constructivist approach. Though the approach is popular worldwide it has constantly observed that while implementing the approach numerous difficulties are faced by the researchers.

2.6 Conclusion

Though the idea of constructivism is very old, research on its effectiveness in education is of recent origin. From the above the review it is clear that a lot of studies have been done in the other areas of constructivist teaching and learning and its effectiveness in science . The present study aims to explore the effectiveness of ICON model over the achievement of the student in science.

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CHAPTER III

METHODOLOGY

CHAPTER III

METHODOLOGY

3.0 Introduction

This is the portion that deals with the presentation of all the methods implemented to gather data and how the actual research work has been conducted by the researcher. In this chapter the methodology steps such as selection of the sample, variable of the study, design of the study, administration of tool and statistical techniques used for the data analysis have been discussed. On the basis of research finding certain generalization can be made which will provide insights towards the study Effectiveness of Interpretation Construction Model on Classroom process and learning achievement of class VII students in Science. This chapter deals with the methodology to achieve the objectives of the study mentioned in the previous chapter. Keeping in view the nature and objectives of the study appropriate sample was selected and tools were developed or adopted.

This chapter deals with:-

1) Research design
2) Sample
3) Tools
4) Collection of data
5) Statistics used

3.1 Research Design

The present study is Quasi – Experimental type in nature, wherein a control and an experimental groups are employed. A non randomized pre test post test design was used. The intact classes of seventh standard as a whole was considered as experimental and control group for the study.

3.2 Variables of the Study

3.2.1 Independent variables

The Independent variable in the present study are the two different teaching approach i.e. Traditional approach and Constructivist approach. The Experimental group was taught by Constructivist Approach and the Control group was taught by the Traditional Approach.

3.2.2 Dependent Variables

In present study the dependent variable is achievement in science.

3.3 Sampling

The method followed for the present study was experimental post test control group design. For conducting the present study purposive sampling technique was used for selection of the school for study.

There were two sections of the class one section was taken as experimental group and another as control group.

Group wise and gender wise distribution of the sample

	Group	Boys	Girls	Total
3	Experimental Group	18	12	30
4	Control Group	19	9	28

3.4 Tools

In the present study self constructed achievement test in science, Observation schedule and reaction scale was used.

3.4.1 Achievement test

In the present study the research has prepared a achievement test taking a chapter from the text book of science of VII standard.

Achievement test was made by researcher by putting the understanding based questions. The topic include in the test were from chapter forest. The test consist of three forms of questions like very short answer type, short answer type and long answer type. The test is test paper cum answer sheet i.e. no separate answer sheet was given to the students. Students were supposed to write answer in the appropriate place provided for each items. There are eight items in achievement test. The total marks for the achievement test is 25. Question number 1.carry three sub parts having 1 mark each, question number 2,3,and4 carry 2 marks each, question number 5and 6 carry 3 marks each and question number7 and 8 carry 5 marks each.

3.4.2 Observation Schedule

The Observation schedule was made by researcher in order to assess the classroom practices. This part contains 15 questions based on steps of ICON model.

3.4.3 Reaction Scale

Reaction scale is made to take the reaction of the students of experimental group to assess whether students preferred this method or not.

3.5 Administration of the Tools

The researcher personally met with principal of the school and acquainted with the teachers concerned and established rapport with the students. Prior to administration the test students were explained about both the test that they were supposed to attempt.

The significance of the test and necessary instructions were given to them made clear that. After this the researcher administered with test on the students. Adequate time was given to the students to complete the test.

3.6 Statistical Technique Used

The statistical technique used for study for analysing the data are given as follows

i) For studying the effectiveness of ICON model in terms of achievement in science One way ANCOVA (Analysis of Covariance) were used.

ii) For studying the effect of ICON model of constructivist approach and Level of Achievement and their Interaction on Students' Achievement in Science 2x2 Factorial Design ANCOVA of Unequal cell size , t- test, mean , SD were used.

iii) For studying the Reaction of teachers and students towards ICON Model percentage were used.

CHAPTER IV

RESULT AND DISCUSSION

CHAPTER IV

RESULTS AND DISCUSSION

4.0. Introduction

This chapter deals with the presentation of data and their analysis to draw the results .The objective wise result and discussion form the part of this chapter under different headings.

4.1. Effectiveness of the ICON model of constructivist approach in terms of achievement in science of students of class VII.

Table 4.1 Summary of ANCOVA or Achievement in Science

Sources of Variance	Df	SS	MSS	F-Value
Among	1	7684.47	7684.47	30.66**
Within	55	13783.16	250.60	
Total	56	21467.63	7935.07	

**significant at 0.01 level

Table 4.2 Mean and SD of the Experimental and Control Groups for Achievement in Science

Treatment	N	Mean	SD
Experimental Group	30	68.80	23.02
Control Group	28	46.14	19.09

The first objective of the study was to study the Effectiveness of the ICON model of constructivist approach in terms of achievement in science of students of class VII. The achievement test was developed by investigator . the test was administered to both the experimental and control group after the end of the teaching .the data were analysed by One Way ANCOVA.

Table 4.1 indicates that the F-value of **30.66** with df=1/55 is significant at 0.01 level, which indicates that the treatment produced a significant effect on the achievement in science.

Further the mean achievement score in science of students' taught through ICON model (68.80 with SD 23.02) is higher than the students taught through traditional approach (46.14 with SD 19.09). It can be therefore , said that the ICON model was found to be effective in terms of achievement in science than the traditional approach of teaching.

This finding supported by Black and McClintock (1999) work. Therefore it can be said that in addition to learning specific content , students were able to acquire generalizable interpretation and argumentation skills.the study conducted by Jayaprabha(2009) on Metacognition Instruction and achievement in science classroom revealed that Metacognition Instruction were most effective in the experimental group in enhancing academic achievement than control group. Patil (2006) conducted the study in teaching English the achievement in English language of class 6^{th} students studying through structural approach and compares its achievement with traditional approach, which is currently used in the classroom. The overall achievement of the students studying through structural approach is significantly higher than traditional approach. Care Stenger and Benadette Garfinkel (2003) studied How the constructivist approach to learn can be used to attain academic standards. The findings of this project showed all the students had responded well to the constructivist approach to learning. The students were able to work through their problem together. An important one being the openness to conversation in the classroom. Khare (1986) conducted a study entitled ''Traditional and Structural approaches of teaching English with reference to learning outcomes''. The conclusions were drawn the students' achievement under the structural approach was better than those under the traditional method in the areas of spelling, pronunciation and applied grammar

The results are positive may be due to the steps followed in ICON Model. As the model provide opportunity to the students to express their views and participate in the class activity. The climate of the classroom was stessfree, co-operative and encouraging with a scope for good deal of students' activity. The approach provided wide opportunity to students for acquiring concepts, interpretating the concept and applies the principles in new way. All the students were found active in the class. The results of the present investigation are an outcome of this student-centered approach. The nature of the approach demands greater involvement of pupils in the teaching learning situation. So, the students were motivated and stimulated to retain and improvement in their achievement.Thus, the researcher can conclude that the ICON Model is effective than traditional approach.

FINDIGS: The ICON Model (M=68.80 with SD 23.02) was found to be effective in terms of achievement in science than the traditional approach of teaching(M=46.14 with SD 19.09).

4.2 Effect of Teaching Strategy and Levels of Achievement on Students' Achievement in Science

The second objective of the investigation was to study the effect of teaching strategy and levels of achievement on students' Achievement in Science. The teaching strategy had two levels, i.e., ICON model of constructivist approach and Traditional method o teaching. Levels of Achievement of students had three levels, high, average and low. For categorizing the students as per their levels of achievement, the pre-test scores of achievement of students were taken in to consideration. As indicated earlier, an Achievement Test was developed by the investigator to measure the Achievement in Science of students. The said test was administered twice to both the groups of students. For studying the effect of the Treatment the scores of Achievement was taken into consideration. The scores were analyzed with the help of 2 X 2 Factorial Design ANCOVA of Unequal Cell Size and subsequent t-test. The results are presented in Table 4.4, below. The effect of different independent variable and

their interactions are presented below under separate captions, 4.2.1, 4.2.2 and 4.2.3.

Table 4.3 F-values for Effect and Interaction of Teaching Strategy and Levels of Achievement on Achievement in Science

Sources of Variance	Df	SSy.x	MSSy.x	F-Value
Treatment	1	1138.07	1138.07	5.07*
Levels of Achievement	2	1822.56	911.28	4.06*
Treat X Levels of Achievement	1	729.77	364.88	1.62
Error	51	11455	224.62	

*significant at 0.05 levels

Table - 4.4 Mean and SD of the Teaching Strategy and Levels of Achievement on Achievement in Science

Treatment	Experimental Group			Control Group		
Levels of Achievement	N	Mean	SD	N	Mean	SD
High	3	92.00	4.00	1	92	-
Average	5	81.60	10.43	8	58.50	13.68
Low	22	62.73	23.54	19	38.53	15.10
Total	30	68.80	23.02	28	46.14	19.09

4.2.1 Effect of Treatment on Achievement

Table 4.3 reveals that the F-value for Teaching Strategy is 5.07 with df equal to 1/51, which is significant at 0.05 level. It indicates that the treatment produced a significant differential effect on the students' achievement in Science. The students taught through ICON model were benefitted more in comparison to the students taught through the Traditional method. Therefore, the null hypothesis, namely, "There is no significant effect of Teaching Strategy on students' Achievement in Science", is rejected.

Further, table 4.3 shows that the mean Achievement score (Science) of students taught through ICON model is 68.80, where as the mean Achievement score (Science) of Traditional Group is 46.14. This demonstrates the better result of the students taught through ICON model than their counterparts who taught through Traditional method..

Finding: There was a significant effect of ICON model of constructivist approach on students' Achievement in Science.

4.2.2 Effect of Levels of Achievement on Students' Achievement in Science

Levels of Achievement of students had three levels, high, average and low. For categorizing the students as per their levels of achievement, the pre-test scores of achievement of students were taken in to consideration. The high (above 60), average (36-59) and low (below-35) achievers were categorized as per their scores of the pre-testing. Table 4.3 shows that the F-value for Levels of Achievement is 4.06 with df equal to 1/51, which is significant at 0.05 level. It indicates that the Levels of Achievement produced a significant differential effect on students' Achievement in Science. It shows that the students' Achievement in Science is dependent on their Levels of Achievement. Therefore, the null hypothesis, namely, "there is no significant effect of Levels of Achievement on the students' Achievement in Science" is rejected. It does signify that the Achievement in Science is dependent of the students' Levels of Achievement.

Further, table 4.3 shows that the mean Achievement score(post-test) of high, average and low achievers of the students taught through the ICON model are 92, 81.60 and 62.73, respectively. In contrast, that the mean Achievement score(post-test) of high, average and low achievers of the students taught through the Traditional method are 92, 58.50 and 38.53, respectively.

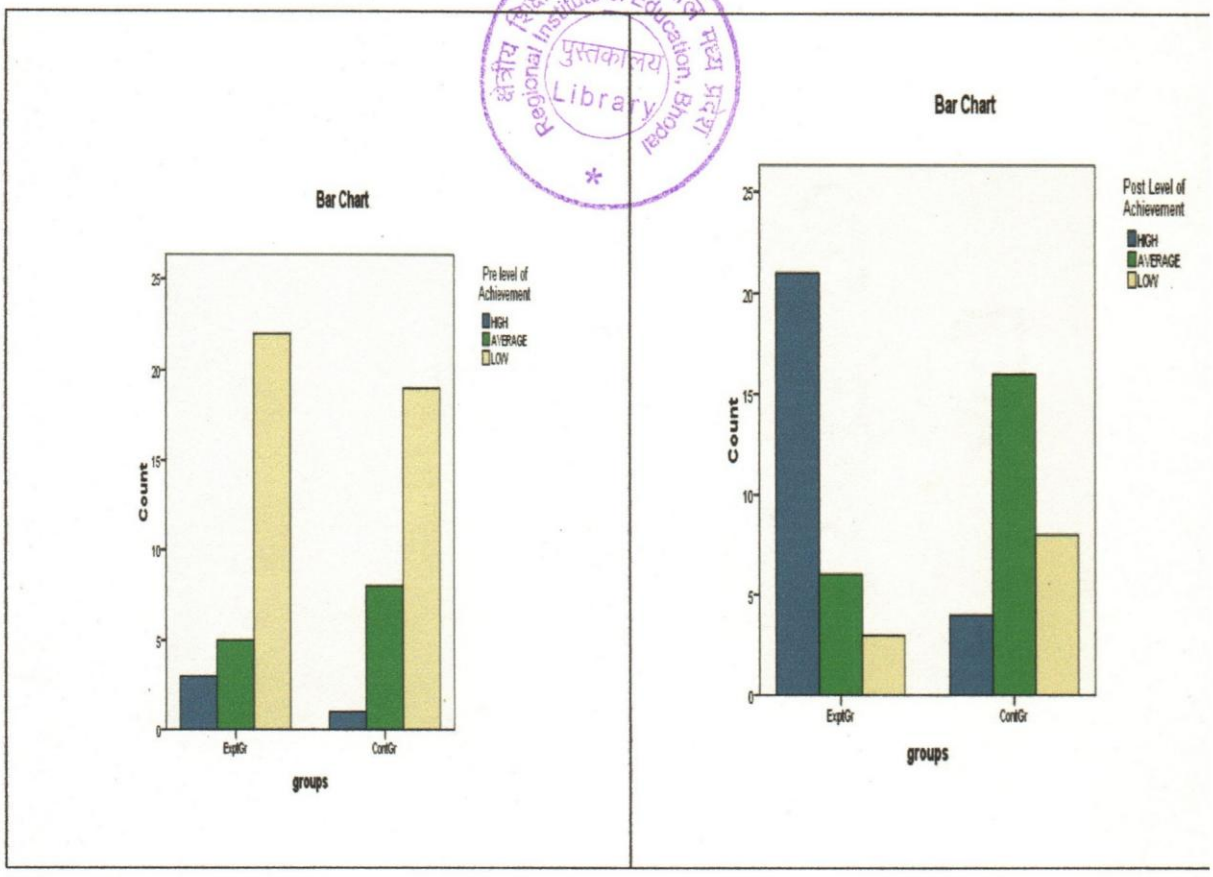

Fig. 4.1: Number of Students of different Groups in Different Levels of Achievement in Pre-test and Post-test

The figure 4.1 depicts the number of students of both the groups in different categories of levels of achievement, i.e., high, average and low. Table 4.5 explains the same, below.

Table - 4.5: Mean of the Achievement in Science of Different Teaching Strategy and Levels of Achievement

Teaching Strategy		ICON Model						Traditional Method					
Levels of Achievement		High		Average		Low		High		Average		Low	
	Stages of Testing	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	
	Pre-test	92	03	81.60	05	62.73	22	92	01	58.50	08	38.53	1
	Post-test	80.57	21	53.33	06	17.33	03	82	04	47.25	16	26	0

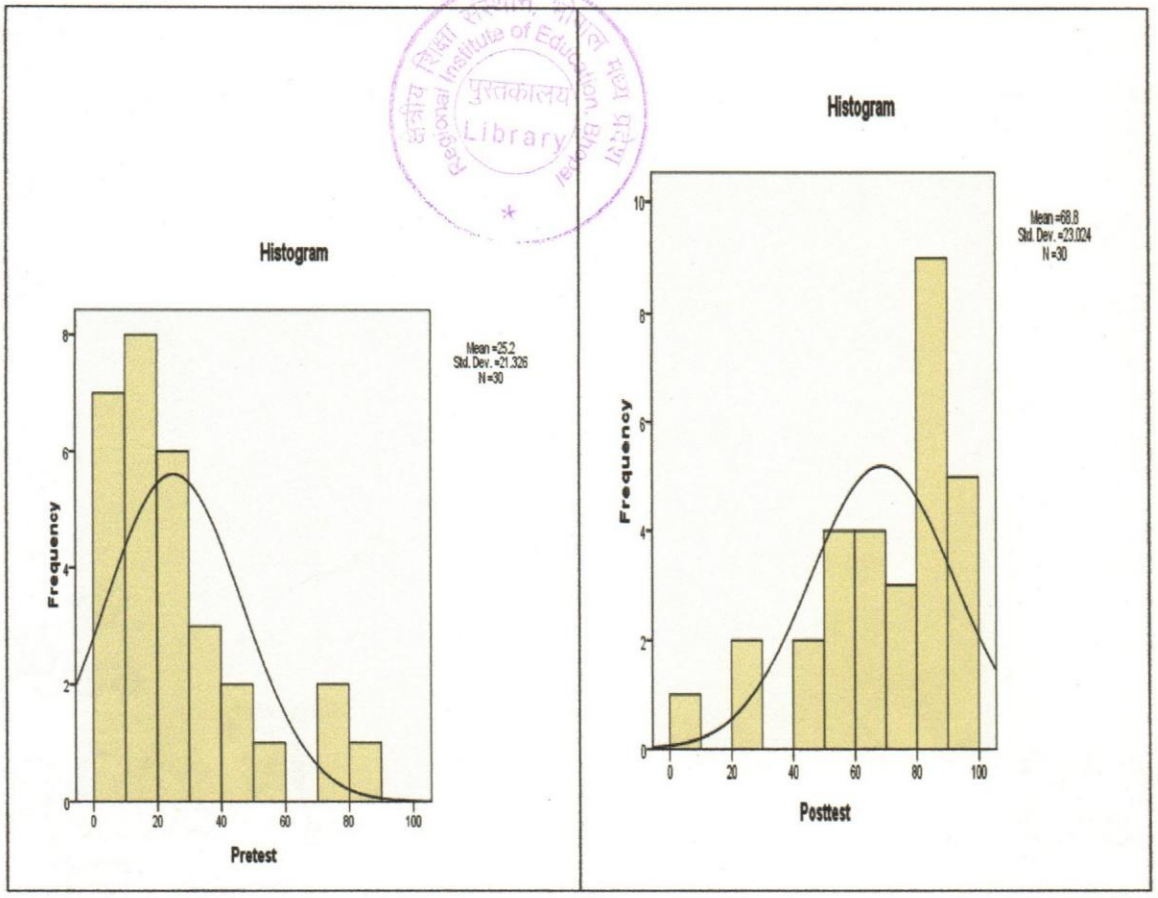

Fig. 4.2 Number of Students of ICON Model in Different Levels of Achievement in Pre-test and Post-test

Level of Achievement	Experimental group				Control group				t-value
	N	Mean	SD	Std error	N	Mean	SD	Std error	
High	3	92.00	4.00	2.30	1	92.00	-	-	0.00
Average	5	81.60	10.43	3.21	8	58.50	13.68	4.83	3.21
low	22	62.73	23.56	3.84	19	38.53	15.09	3.46	3.84

Table - 4.6: Mean, SD and t-values for Achievement in Science of different levels of Achievement

From the above mentioned table 4.6, it can be said that the t-values of average and low achievers are significant at 0.01 level. The mean scores of average and low achievers of ICON Model group (experimental) are 81.60 and 62.73 , respectively and the mean scores of average and low achievers of Traditional group (Control) are 58.50 and 38.53,respectively. But there is no difference in the mean achievement scores of high achievers of both the experimental and control groups. As there were significant difference in the mean scores of

achievement of average and low achievers of both the experimental and control groups, therefore, the F-value (4.06) for Levels of Achievement, mentioned in table 4.3 was significant

Finding: Levels of Achievement produced a significant differential effect on the students' Achievement in Science.

4.2.3 Interaction of Teaching Strategy and Levels of achievement on Students' Achievement in Science

Table 4.3 reveals that the F-value of 1.62 for Interaction of Teaching Strategy and Levels of Achievement on students' Achievement in Science is not significant at 0.05 levels with df equal to 1/51. It shows that there was no interactional effect of Teaching Strategy and Levels of Achievement on students' Achievement in Science. Therefore, the null hypothesis "There is no significant Interaction of Teaching Strategy and Levels of achievement on students' Achievement in Science" is not rejected.

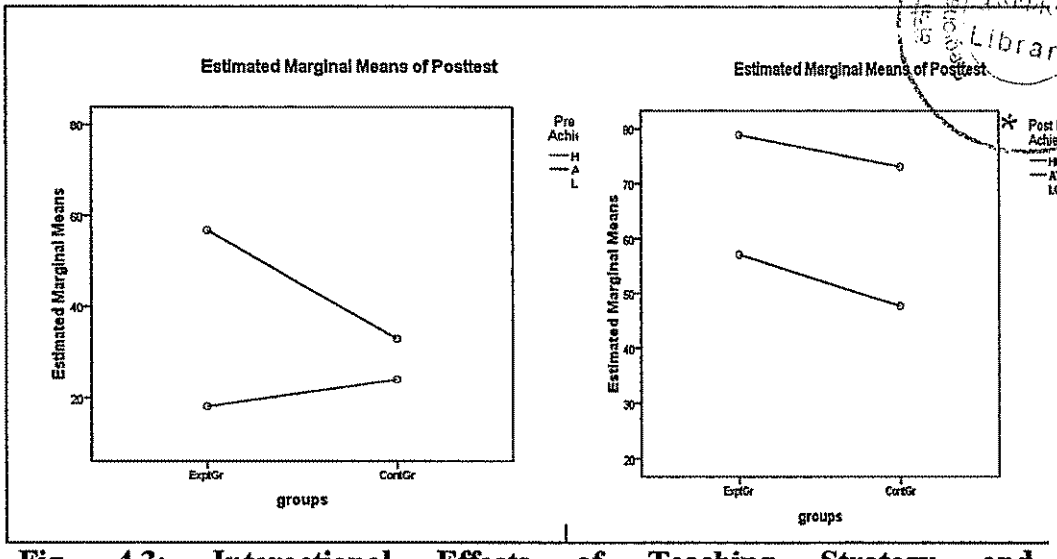

Fig. 4.3: Interactional Effects of Teaching Strategy and Levels of achievement on students' Achievement in Science at Pre-Testing and Post-Testing categorization

Fig. 4.3 reveals that the number of high achievers of both the experimental and control groups are very few and their mean scores of achievement were also low at the pre-testing stage. But at the post-testing stage, the number of high achievers of experimental group were increased and their mean score as well as the raw score, also, increased. It signifies that the ICON Model of Constructivist Approach produced a significant differential effect on the students' Achievement in science, without any interactional effect.

Findings: There was no significant Interaction of Teaching Strategy and Levels of achievement on students' Achievement in Science .

4.3 The Reaction of students towards ICON Model.

Table 4.7-Reaction of students towards ICON Model

S.NO.	QUESTIONS	YES	NO	SOMETIMES
1.	Did you enjoy the video clipping?	97%	-	3%
2.	Did you feel any difficulty in understand the video clipping?	-	90%	10%
3.	By studying through this method did you feel any problem?	-	93%	7%
4.	Did this method help you in understanding the concepts?	97%	-	3%
5.	Did you feel good when you had learnt by your own?	97%	-	3%
6.	Did you feel good while questions were asked in the classroom	97%	*	3%
7.	Did you asked any question during the class?	80%	10%	10%
8.	Did this method inspire you to think in different ways?	97%	-	3%
9.	Did you feel that your regular teacher should teach you through this method?	83%	3%	14%

10	Did you feel boring during the activity?	-	97%	3%

A reaction scale was constructed to study the reaction of the students towards the model employed for teaching the lesson. The scale was administered to the experimental group after teaching 10 lessons. There were 10 statements in the scale. There were positive and negative statements for model. Data were analysed with the help of percentage.

The results are presented in the above table.

Ninety seven percent students are of the opinion that they had enjoyed the video clippings. Ninety percent students didn't find any difficulty in understanding the video clipping. Ninety four percent students didn't feel any problem when taught through ICON model. Ninety seven percent students are of opinion that they understood the concept in a better way. Ninety seven percent students reflected that they felt good when they had learnt by their own and eighty percent students said that they had asked questions during the class. Ninety seven percent students were interested when the questions were asked to them. Ninety seven percent students reflected that ICON Model had inspired them to think in different ways and ninety seven percent students said that they didn't feel boring during the class activity. Eighty three percent students also shared their opinion that their regular teacher should adopt this method for their teaching.

Thus, from the reaction of the students towards the ICON Model researcher can conclude that the ICON Model was an effective approach .

Findings: Regarding the reaction of students towards the ICON Model, majority of the students liked this method.

This finding supported by the study done by Pritinanda(2013). Therefore it can be said that in addition to learning specific content , students enjoyed the activity.Thus, from the reaction of the students towards the ICON Model researcher can conclude that the ICON Model was an effective approach and should be encouraged.

4.4.0 The Reaction of teachers towards ICON Model.

Table 4.8-Reaction of s teachers towards ICON Model

S.NO	QUESTIONS	YES	NO	SOMETIMES
1	Are the students observing the given material?	100%	-	-
2	Are the students showing interest in observing the given material?	100%	-	-
3	Are the students' interpretating the concept?	50%	-	50%
4	Are the students constructing arguments for the validity of their interpretation?	40%	-	60%
5	Are the students understanding the concept?	70%	-	30%
6	Are the students relating the concept with their day today life?	60%	-	40%

7	Is the teacher helping the learners to actively participate in the activity?	100%	-	-
8	Are the students serving as apprenticeship to teachers to master ,observation, interpretation and contextualization?	40%	-	60%
9	Are the students learning in a collaborative way?	60%	-	40%
10	Are the students interacting with peers?	80%	-	20%
11	Is the teacher creating such a situation where the learners can construct their own knowledge?	70%	-	30%
12	Is the teacher able to facilitate the students in right direction?	90%	-	10%
13	Is the teacher probing the students for questioning?	90%	-	10%
14	Are the students' interrelating the concepts in multiple ways?	80%		20%
15	Are the students justifying their interpretation in a multiple way?	80%	-	20%

The third objective of the study was to study the reaction of teachers. For this purpose an observation schedule prepared by researcher which was filled by teachers by observing the class. It contains 15 questions. Only the experimental group was observed. The result is presented in above table.

The table reveals that all the students in the classroom were observing the video clipping carefully and showing their interest. Fifty percent students were able to interpretate the concept and forty percent students were constructing the arguments for the validity for their interpretation. Seventy percent students understood the concept and sixty percent students were able to relating the concept with their day to day life. Observer felt that the teacher was giving their hundred percent so that learner actively participate in class activity. Forty percent students serving as apprenticeship to teacher to master observation interpretation and contextualization. Observer felt that sixty percent class was learning in a collaborative way and eighty percent class was interacting with peers. Seventy percenttimes teacher was creating such situations where the learner can construct their own knowledge. Ninety percenttimes teacher was able to facilitate the students in right direction and she was probing the questions for students. Eighty percent class was interrelating the concept in multiple ways and justifying their interpretation.

Therefore it can be inferred that ICON Model can make the students active in class and can develop some affective aspects in the students.

Findings: Regarding the teacher's observation it was found that ICON Model can make the students active in class and can develop some affective aspects in the students. This finding supported by Deepa, Sadananthan (May2012) work.

CHAPTER V

SUMMARY AND IMPLICATIONS

CHAPTER V

SUMMARY AND IMPLICATIONS

5.0 Introduction

The present study was planned to investigate the Effectiveness of Interpretation Construction Model on classroom process and learning Achievement of class VII students in science. In this chapter, discussion on the findings, summary and conclusion is presented on the basis of the data given in the chapter IV.

5.1 Justification of the Study

Constructivist teaching is based on the belief that learning occurs as learners are actively involved in a process of meaning and knowledge construction rather than passively receiving information. Learners are the makers of meaning and knowledge. Constructivist teaching fosters critical thinking and creates motivated and independent learners. In constructivism there are many types of models. The present study the researcher has focused on ICON model,which reflects how cognitive psychology, technology and constructivism can be integrated into instructional activities. The ICON model has seven steps which are observation, Interpretation construction, contextualization, cognitive apprenticeship, collaboration, Interpretation construction, multiple interpretation, multiple manifestation. These steps help the learner to construct their own knowledge. As the science subject requires ability of keen observation , critical thinking, problem solving and multiple interpretation etc. The researcher feels that this method helps the learner in developing those qualities.

5.2 Statement of the Problem

The present study seeks answers to such questions as i) whether there exists any effect of ICON model of constructivist approach in terms of achievement in science of students of class VII. ii)whether

there exist any effect of ICON model of constructivist approach and Level of Achievement and their Interaction on Students' Achievement in Science. iii) the Reaction of teachers and students towards ICON Model.

The above questions constituting the problem of the present study have been investigated under the title

"Effectiveness of Interpretation Construction Model on classroom process and learning achievement of class VII students in science".

5.3 Objectives of the Study

The following objectives are framed for the study.

i) To study the effectiveness of the ICON model of constructivist approach in terms of achievement in science of students of class VII.

ii) To study the effect of ICON model of constructivist approach and Level of Achievement and their Interaction on Students' Achievement in Science.

iii) To study the Reaction of teachers and students towards ICON Model.

5.4 HYPOTHESIS

i) Students taught through ICON Model will gain significantly higher scores as compared to their counter parts in their control group.

ii)There will be no significant effect of Teaching Strategy on students' Achievement in Science.

iii)There will be no significant effect of Levels of Achievement on the students' Achievement in Science.

iv)There will be no significant Interaction of Teaching Strategy and Levels of achievement on students' Achievement in Science.

5.5 Delimitations

In view of the research constraints under which the study was conducted it remained confined to the following:

i .The CBSE syllabus of class VII science only.

ii. Demonstration Multipurpose school Bhopal.

iii.Only10 days treatment was given.

iv.Only10 lesson plans were taught .

v. Only one chapter was taught.

5.6 Sample

There were two sections of the class one section was taken as experimental group and another as control group.

Group wise and gender wise distribution of the sample

Group	Boys	Girls	Total
Experimental Group	18	12	30
Control Group	19	9	28

5.7 Variables

The Independent variable in the present study are the two different teaching approach i.e. Traditional approach and Constructivist approach. The Experimental group was taught by Constructivist Approach and the Control group was taught by the Traditional Approach.

In present study the dependent variable is achievement in science.

5.8 Tools

In the present study self constructed achievement test in science, Observation schedule and reaction scale was used.

5.9 Findings

The following findings from the interpretation of data presented in the previous chapter.

i)The ICON Model(M=68.80 with SD 23.02) was found to be effective in terms of achievement in science than the traditional approach of teaching(M=46.14 with SD 19.09).

ii)There was a significant effect of ICON model of constructivist approach on students' Achievement in Science.

iii)Levels of Achievement produced a significant differential effect on the students' Achievement in Science.

iv) There was no significant Interaction of Teaching Strategy and Levels of achievement on students' Achievement in Science .

v)Regarding the reaction of students towards the ICON Model, majority of the students liked this method.

vi)Regarding the teacher's observation it was found that ICON Model can make the students active in class and can develop some affective aspects in the students.

5.10 Implications

The findings revealed that the ICON Model is effective strategy of teaching. It is teacher's duty to give freedom of self expression to the students with in as well as outside the classroom, so that students' expression, interpretation,contextualization ability will develop, specially in low and average students .The curriculum developer make the curriculum in such a way that the stress should be given to the self expression of the students.

5.11 Suggestions for further studies

1.The study can be conducted on a large sample for precise results.

2.Rural environment can be consolidated with urban one for a wide scope.

3.Different grade levels can be selected.

4.The study can be conducted on different subjects as well.

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APPENDICES

APPENDICES

ACHIEVEMENT TEST

STD VII **Marks: 25**

Sub: Science **Time: 35 min**

I Mention any two names of plants which provide us the following (1x 3 = 3mark)

a) Medicines .....

b) Clothing.....

c) Food.....

II How do forest regulate temperature (2 marks)

.....

.....

.....

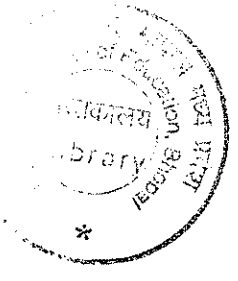
III What is the role of decomposers (2 marks)

.....

.....

.....

IV Draw a food chain (2marks)



V How are animals important for plants (3 marks)

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VI How do forest help to protect soil (3 marks)

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VII What do you mean by interdependence of plant and animal. Give example

(5 marks)

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VIII What impact does deforestation (5 marks)

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REACTION SCALE

1.Did you enjoy the video clipping?

Yes/ No/ Sometimes

2.Did you feel any difficulty in understand the video clipping?

Yes/ No/ Sometimes

3.By studying through this method did you feel any problem?

Yes/ No/ Sometimes

4.Did this method help you in understanding the concepts?

Yes/ No/ Sometimes

5.Did you feel good when you had learnt by your own?

Yes/ No/ Sometimes

6.Did you feel good while questions were asked in the classroom?

Yes/ No/ Sometimes.

7.Did you asked any question during the class?

Yes/ No/ Sometimes.

8.Did this method inspire you to think in different ways?

Yes/ No/ Sometimes

9.Did you feel that your regular teacher should teach you through this method?

Yes/ No/ Sometimes

10.Did you feel boring during the activity?

Yes/ No/ Sometimes

OBSERVATION SCHEDULE

1. Are the students observing the given material?Yes/ No/sometimes.
2. Are the students showing interest in observing the given material? Yes/No/sometimes.
3. Are the students' interoperating the concept?Yes/ No/sometimes.
4. Are the students construct arguments for the validity of their interpretation? Yes/ No/sometimes.
5. Are the students understanding the concept? Yes/ No/sometimes.
6. Are the students relating the concept with their day today life? Yes/ No/sometimes.
7. Is the teacher helping the learners to actively participate in the activity?Yes/ No/sometimes.
8. Are the students serving as apprenticeship to teachers to master , observation, interpretation and contextualization?Yes/ No/sometimes.
9. Are the students learning in a collaborative way? Yes/ No/sometimes.
10. Are the students interacting with peers? Yes/ No/sometimes.
11. Is the teacher creating such a situation where the learners can construct their own knowledge? Yes/ No/sometimes.
12. Is the teacher able to facilitate the students in right direction?
13. Yes/ No/sometimes.
14. Is the teacher probing the students for questioning? Yes/ No/sometimes.
15. Are the students' interrelating the concepts in multiple way? Yes/ No/sometimes
16. Are the students justifying their interpretation in a multiple way? Yes/No/sometimes

PLANNING OF LESSON

Planning Of Lesson No .1

Part I

Subject: science

Class: VII

Topic: Concept of forest

Chapter: 17- Forest

Teaching learning methods and technique; Discussion, Explaining, Question answer , drawing.

Part II

Objectives: To enable the child to understand the basic concept of forest

Learning resources: video clippings, images, text book

Teaching learning process

1) Teacher ask the students to observe the video clippings carefully.

2) After this teacher has divided the class into 6 groups.

3) Teacher ask them to discuss what they have observed in the video clipping and list out them.

4) In between teacher asked do any one visited to forest and to share their experience .

5) Teacher ask students to write the points on black board

6) Then teacher ask try to categorise those points in different group.

Part III Lesson Report

1.Observation

Students had observed the video clipping based on topic carefully.

2.Contextualization

Depending on the observation students discussed within the groups and list out the points accordingly like...in addition to trees , we find animals like monkeys, butterflies and birds.

3. Cognitive Apprenticeship

Teacher ask questions what you find in deeper forest ?

4.Collaboration

All points were discussed in intergroup and then written by the student on blackboard.

5. Interpretation Construction

Teacher asked them try to categorise those points in different categories. so that the students develop ownership of their work by developing their own interpretations.

6.Multiple Interpretation

Teacher asked what is the difference between forest and a garden or park? Students recall their previous knowledge and experiences.

7.Multiple Manifestation

Students had also discussed about the different types of forest, plants and animals found in those forests.

Part IV

Home assignment: to observe trees and shrubs in park and draw the shape of crowns of trees .

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Planning Of Lesson No .2

Part I

Subject: science

Class: VII

Topic: Uses of forest

Chapter: 17- Forest

Teaching learning methods and technique; Discussion, Explaining, Question answer , drawing.

Part II

Objectives: To enable the child to understand the basic Uses of forest

Learning resources: video clippings, images, text book

Teaching learning process

1) Teacher ask the students to observe the video clippings carefully.

2) After this teacher has divided the class into 6 groups.

3) Teacher ask them to discuss what they have observed in the video clipping and list out them.

4) In between teacher asked to discuss about useful plants in our home and kitchen gardens.

5) Teacher ask students to write the points on black board

6) Then teacher ask try to categorise those points in different group.

Part III Lesson Report

1.Observation

Students had observed the video clipping based on topic carefully.

2.Contextualization

Depending on the observation students discussed within the groups and list out the points accordingly

3. Cognitive Apprenticeship

Teacher asked to list about plant products that come from forest found in our home, how forest are useful for wild life?

4.Collaboration

All points were discussed in intergroup and then written by the student on blackboard.

5. Interpretation Construction

Teacher asked them try to categorise those points in different categories. so that the students develop ownership of their work by developing their own interpretations.

6.Multiple Interpretation

Teacher asked how forest are important for our enviroment ? Students recall their previous knowledge and experiences.

7.Multiple Manifestation

Students had also discussed about how forest are related to good rainfall.

Part IV

Home assignment: To bring 2 forest product from home.

Planning Of Lesson No .3

Part I

Subject: science

Class: VII

Topic: What you find on the forest floor?

Chapter: 17- Forest

Teaching learning methods and technique; Discussion, Explaining, Question Answer , Drawing.

Part II

Objectives: To enable the child to understand what does forest floor contain?

Learning resources: video clippings, images, text book

Teaching learning process

1) Teacher ask the students to observe the video clippings carefully.

2) After this teacher has divided the class into 6 groups.

3) Teacher ask them to discuss what they have observed in the video clipping and list out them.

4) In between teacher asked to imagine any park you had visited and list the things you found on ground.

5) Teacher ask students to write the points on black board

6) Then teacher asked from where those materials come?

Part III _Lesson Report

1.Observation

Students had observed the video clipping based on topic carefully.

2.Contextualization

Depending on the observation students discussed within the groups and list out the points.

3. Cognitive Apprenticeship

Teacher asked to imagine any park you had visited and list the things you found on ground.

4.Collaboration

All points were discussed in intergroup and then written by the student on blackboard.

5. Interpretation Construction

Teacher asked them try to categorise those points in different categories. so that the students develop ownership of their work by developing their own interpretations.

6.Multiple Interpretation

Teacher asked the use of those materials found on forest floor?

7.Multiple Manifestation

Students had also discussed that nothing get wasted in forest.

Planning Of Lesson 4

Part I

Subject: science

Class: VII

Topic: Dependence of plants on animals

Chapter: 17- Forest

Teaching learning methods and technique; Discussion, Explaining, Question answer , drawing

Part II

Objectives: To enable the child to understand the basic concept of dependence of plants on animals.

Learning resources: video clippings, images, text book

Teaching learning process

1) Teacher ask the students to observe the video clippings carefully.

2) After this teacher has divided the class into 6 groups.

3) Teacher ask them to discuss what they have observed in the video clipping and list out them.

4) In between teacher asked question how humans beings are helpful for plants?

5)Teacher ask students to write the points on black board

6)Then teacher ask try to categorise those points in different group.

Part III Lesson Report

1.Observation

Students had observed the video clipping based on topic carefully.

2.Contextualization

Depending on the observation students discussed within the groups and list out the points accordingly like...plants need carbon di oxide for photosynthesis, through cow dung seeds get dispersed etc.

3. Cognitive Apprenticeship

Teacher ask questions whether how human beings are helpful for plants? One student has asked question to their friends how insects are important for plants?

4.Collaboration

All points were discussed in intergroup and then written by the student on blackboard.

5. Interpretation Construction

Teacher asked them try to categorise those points in different categories. so that the students develop ownership of their work by developing their own interpretations.

6.Multiple Interpretation

Teacher asked how seeds are formed. Students recall previous chapter about reproduction in plants their they studied about pollination

Students came out with the result by making three categories like plants

7.Multiple Manifestation

Students had also discussed that animals also indirectly depend on plants as it prevent soil erosion, control pollution and maintain water cycle.

Part IV

Home assignment: write at least 5 points how animals indirectly depend on plants.

Planning Of Lesson 5

Part I

Subject: science

Class: VII

Topic: Dependence of animals on plant

Chapter: 17- Forest

Teaching learning methods and technique; Discussion, Explaining, Question answer , drawing

Part II

Objectives: To enable the child to understand the basic concept of dependence of animals on plants.

Learning resources: video clippings, images, text book

Teaching learning process

1) Teacher ask the students to observe the video clippings carefully.

2) After this teacher has divided the class into 6 groups.

3) Teacher ask them to discuss what they have observed in the video clipping and list out them.

4) In between teacher asked questions like Do forest or plants play any role in environmental balance?

5)Teacher ask students to write the points on black board

6)Then teacher ask try to categorise those points in different group.

Part III Lesson Report

1.Observation

Students had observed the video clipping based on topic carefully.

2.Contextualization

Depending on the observation students discussed within the groups and list out the points accordingly like...Animals get fruits, grains from plants, Snake make holes in tree and live there, birds ,monkeys they live on trees, deer and small animals hide themselves in shrubs, most important we get oxygen from plants etc

3. Cognitive Apprenticeship

Teacher ask questions whether forest or plants play any role in environmental balance. One student has asked question to their friends how plants are important for insects and microorganisms.

4.Collaboration

All points were discussed in intergroup and then written by the student on blackboard.

5. Interpretation Construction

Teacher asked them try to categorise those points in different categories. so that the students develop ownership of their work by developing their own interpretations.

6.Multiple Interpretation

Students came out with the result by making three categories

Animals depend on plants for food, for shelter , for oxygen

7.Multiple Manifestation

Students had also discussed that animals also indirectly depend on plants as it prevent soil erosion, control pollution and maintain water cycle.

Part IV-Home assignment: write at least 5 points how animals indirectly depend on plants.

Planning Of Lesson No .6

Part I

Subject: science

Class: VII

Topic: Interdependence Of Plants And Animals

Chapter: 17- Forest

Teaching learning methods and technique; Discussion, Explaining, Question answer , drawing.

Part II

Objectives: To enable the child to understand how plants and animals depend on each other.

Learning resources: video clippings, images, text book

Teaching learning process

1) Teacher ask the students to observe the video clippings carefully.

2) After this teacher has divided the class into 6 groups.

3) Teacher ask them to discuss what they have observed in the video clipping and list out them.

4) In between teacher asked to discuss about ultimate source of energy , what are producers.

5) Teacher ask students to write the points on black board

6) Then teacher ask try to categorise those points in different group.

Part III Lesson Report

1.Observation

Students had observed the video clipping based on topic carefully.

2.Contextualization

Depending on the observation students discussed within the groups and list out the points.

3. Cognitive Apprenticeship

Teacher asked to list out the points how animals are useful for plants and how plants are useful for animals

4.Collaboration

All points were discussed in intergroup and then written by the student on blackboard.

5. Interpretation Construction

Teacher asked them try to categorise those points in different categories. so that the students develop ownership of their work by developing their own interpretations.

6.Multiple Interpretation

Teacher asked the use of insects and fungi for animals and plants?

7.Multiple Manifestation

Students had also discussed that survival of all living things is dependent on each other.

Part IV

Home assignment: Write the examples of carnivores, herbivores, and omnivores.

Planning Of Lesson No .7

Part I

Subject: science

Class: VII

Topic: Food chain and food web

Chapter: 17- Forest

Teaching learning methods and technique; Discussion, Explaining, Question answer , drawing.

Part II

Objectives: To enable the child to understand the concept of food chain and food web.

Learning resources: video clippings, images, text book

Teaching learning process

1) Teacher ask the students to observe the video clippings carefully.

2) After this teacher has divided the class into 6 groups.

3) Teacher ask them to discuss what they have observed in the video clipping and list out them.

4) In between teacher asked to discuss about ultimate source of energy , what are producers.

5) Teacher draw the picture of a plant on black board and call one by one Student Complete The Food Chain And Then To Make A Food Web.

Part III -Lesson Report

1.Observation

Students had observed the video clipping based on topic carefully.

2.Contextualization

Depending on the observation students discussed within the groups and list out the points.

3. Cognitive Apprenticeship

Teacher asked to list out the points how plants are useful for animals and how energy transfers from plants to animals.

4.Collaboration

All points were discussed in intergroup and then written by the student on blackboard.

5. Interpretation Construction

Teacher asked them try to draw a food chain . so that the students develop ownership of their work by developing their own interpretations.

6.Multiple Interpretation

Teacher asked the each student to come and extend the chain drawn on blackboard.

7.Multiple Manifestation

Students had also discussed the difference between food chain and food web, Marine food chain.

PART IV

Home assignment: Draw a food chain and food web

Planning Of Lesson No .8

Part I

Subject: science

Class: VII

Topic: soil erosion

Chapter: 17- Forest

Teaching learning methods and technique; Discussion, Explaining, Question answer , drawing.

Part II

Objectives: To enable the child to understand the concept of soil erosion.

Learning resources: video clippings, images, text book

Teaching learning process

1) Teacher ask the students to observe the video clippings carefully.

2) After this teacher has divided the class into 6 groups.

3) Teacher ask them to discuss what they have observed in the video clipping and list out them.

4) In between teacher asked to discuss about the uses soil.

5) Teacher ask students to write the points on black board

6) Then teacher ask try to categorise those points in different group.

Part III Lesson Report

1.Observation

Students had observed the video clipping based on topic carefully.

2.Contextualization

Depending on the observation students discussed within the groups and list out the points.

3. Cognitive Apprenticeship

Teacher asked to list out the points how soil is useful for animals and plants

4.Collaboration

All points were discussed in intergroup and then written by the student on blackboard.

5. Interpretation Construction

Teacher asked them try to categorise those points in different categories. so that the students develop ownership of their work by developing their own interpretations.

6.Multiple Interpretation

Teacher asked the student reasons of soil erosion and it can be prevented?

7.Multiple Manifestation

Students had also discussed the how overgrazing by cattle affect soil erosion

Part IV

Home assignment: write the reasons of soil erosion.

Planning Of Lesson No .9

Part I

Subject: science

Class: VII

Topic: Deforestation

Chapter: 17- Forest

Teaching learning methods and technique; Discussion, Explaining, Question answer , drawing.

Part II

Objectives: To enable the child to understand the concept of Deforestation.

Learning resources: video clippings, images, text book

Teaching learning process

1) Teacher ask the students to observe the video clippings carefully.

2) After this teacher has divided the class into 6 groups.

3) Teacher ask them to discuss what they have observed in the video clipping and list out them.

4) In between teacher asked to discuss about the reasons behind the cutting of trees.

5) Teacher ask students to write the points on black board

6) Then teacher ask try to categorise those points in different group.

Part III Lesson Report

1.Observation

Students had observed the video clipping based on topic carefully.

2.Contextualization

Depending on the observation students discussed within the groups and list out the points.

3. Cognitive Apprenticeship

Teacher asked to list out the points reasons behind the cutting of trees.

4.Collaboration

All points were discussed in intergroup and then written by the student on blackboard.

5. Interpretation Construction

Teacher asked them try to categorise those points in different categories. so that the students develop ownership of their work by developing their own interpretations.

6.Multiple Interpretation

Teacher asked the student how the cutting of trees can be prevented?

7.Multiple Manifestation

Students had also discussed the how deforestation affect wild life and environment

Part IV

Home assignment: write the reasons of deforestation.

Planning Of Lesson No .10

Part I

Subject: science

Class: VII

Topic: Scavengers and Decomposers

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Chapter: 17- Forest

Teaching learning methods and technique; Discussion, Explaining, Question answer , drawing.

Part II

Objectives: To enable the child to understand the concept Scavengers and Decomposers.

Learning resources: video clippings, images, text book

Teaching learning process

1) Teacher ask the students to observe the video clippings carefully.

2) After this teacher has divided the class into 6 groups.

3) Teacher ask them to discuss what they have observed in the video clipping and list out them.

4) In between teacher asked have you seen any animals eating dead animals? Write their name.

5) Teacher ask students to write the points on black board

6) Then teacher ask try to categorise those points in different group.

Part III Lesson Report

1.observation

Students had observed the video clipping based on topic carefully.

2.Contextualization

Depending on the observation students discussed within the groups and list out the points.

3. Cognitive Apprenticeship

Teacher asked have you seen any animals eating dead animals? Write their name..

4.Collaboration

All points were discussed in intergroup and then written by the student on blackboard.

5. Interpretation Construction

Teacher asked them try to categorise those points in different categories. so that the students develop ownership of their work by developing their own interpretations.

6.Multiple Interpretation

Teacher asked the student how they are useful for nature?

7.Multiple Manifestation

Students had also discussed the how forest is a dynamic living entity.

Part IV

Home assignment: write the examples of scavengers and decomposers.