

**ATTITUDE OF PRE-SERVICE TRAINEE TEACHERS TOWARDS
SE MODEL OF CREATING LEARNING SITUATION:
ACHIEVABILITY AND CHALLENGES**

**A DISSERTATION
Submitted to
Barkatullah University, Bhopal
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DECLARATION

I do hereby declare that this study entitled "Attitude of pre-service trainee teachers towards SE model of creating learning situation: Achievability and Challenges" has been undertaken by me in partial fulfillment of the requirement for the Degree of Master of Education.

I have completed this study under the guidance of Mr. Anand Valmiki, Assistant Professor in Education, Regional Institute of Education, Bhopal and under guidance of Mr. Sanjay Kumar Pandagale, Assistant Professor in Education, Regional Institute of Education.

I further declare that others or I have not submitted this dissertation earlier for any degree either in the Barkatullah University or for any other university.

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CERTIFICATE

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CHAPTER I

INTRODUCTION

CHAPTER I

INTRODUCTION

10 INTRODUCTION

It seems that every 3 to 5 years a new idea surfaces in the educational community about teaching and learning process. The new ideas are researched, discussed, and argued in institutions of higher learning; however, when it eventually filters down to the teachers in elementary and high school, there is little time invested in explaining and understanding the new theory - they are told, "Just do it!" The latest educational buzzword in India is *constructivism* advocated and propagated by National Curriculum Framework for School Education: 2005 (NCFSE 2005) evolved and endorsed by National Council of Educational Research and Training (NCERT). In this context, Regional Institute of Education (RIE), Bhopal being a constituent unit of NCERT, adopted constructivism as an approach to teaching and learning during the of internship in teaching (2013-14) for pre-service trainee teacher education programs i.e. two year B. Ed and B. Sc. B. Ed. and B.A. B. Ed. semester courses.

Furthermore, RIE Bhopal has trained the said pre-service trainee teachers in SE Model that enables teachers in creating learning situations that falls under constructivist paradigm/ approach. It is in this context the proposed study attempts to inquire into pre-service teachers attitude towards SE model as they have completed the internship in teaching and learning in various schools of Madhya Pradesh (MP), Maharashtra (MH) and Gujarat (GJ).

Training to pre-service trainee teachers is given through this teaching and learning approach, and design instruction accordingly. The basic definition of constructivism: individuals building their own understanding, to a more thorough explanation of the theory and its various aspects. Examples are provided via the SE learning Model. The SE model for designing science lessons is just one method of instruction that supports constructivist teaching|learning.

1.1 GUIDING PRINCIPLES: NCF-2005

1. Connecting knowledge to life outside the school.
2. Ensuring learning is shifted away from rote method.
3. Enriching the curriculum to provide for overall development of children rather than remain textbook centric.

4. Making examinations more flexible, non-threatening and integrated into classroom life.
5. Nurturing an over-riding identity informed by caring. Concerns within the democratic polity of the country.

12 WHAT IS CONSTRUCTIVISM?

Constructivism may be considered an epistemology (a philosophical framework or theory of learning) (Jean Piaget), which argues humans construct meaning from current knowledge structures. Formulation of the theory of constructivism is generally attributed to Jean Piaget, who articulated mechanisms by which knowledge is internalized by learners. He suggested that through process of accommodation and assimilation, individuals construct new knowledge from their experiences. When individuals assimilate, they incorporate the new experience into an already existing framework without changing that framework. This may occur when individuals' experiences are aligned with their internal representations of the world, but may also occur as a failure to change a faulty understanding.

13 CONCEPTUAL FRAMEWORK

Constructivism in science education is based upon a philosophy that all learning is constructed and that new knowledge is built upon the prior experiences of the learner (Fox, 2001;

Gil-Perez et al., 2002; Hoover, 1996; Kruckeberg, 2006; Naylor, 1999; Toh, Ho, Chew, & Riley II, 2003). The foundation of constructivism is attributed to the work of Dewey, Piaget, and Vygotsky who maintain that how students respond to new learning situations is influenced by their prior knowledge (Hyslop-Margison&Strobel, 2011)

This philosophy has influenced a change in science curriculum and instruction to take into account students' experiences (Osborne, 1996). Fox (2001) asserts that the foundation of constructivism is based upon the idea that learning is not passively absorbed. [It is an active process in which knowledge is both invented and personal to the learner. The key for learning is fundamentally linked to the active participation of the learner. New knowledge can only be constructed by linking meaning to the learner's previous, existing knowledge (Naylor, 1999).

Construction of science knowledge is dependent upon the experiences the student brings into the classroom (Kruckeberg, 2006). With that in mind, teaching is more than filling the learner's head with prepackaged pieces of information that the learner dumps after rests



(Roth, 1990). These "downloaded" pieces of knowledge have little value to the learner unless he is able to organize and process the information in relationship to his current understandings and previous experiences (Henze, 2008; Hoover, 1996; Kruckeberg, 2006).

The constructive process of learning is considered an inquiry process that is student-centered. The learner constantly is referencing new knowledge to prior experiences either to build upon what he/she already knows or to modify existing knowledge. Actively processing information involves examining new information, organizing the information and comparing interpretations with others, all the while trusting that the new knowledge is worth the effort of integration. For students to be able to compare their interpretations to their peers, they must first be able to express their understanding of the information. This articulation process alone helps the student to organize and evaluate his/her understanding. Discussion with peers exposes students to perspectives that may be different from their own and may ultimately result in a different or deeper understanding of concepts (Henze, 2008; Hoover, 1996). The process of integrating knowledge takes time since pre-existing knowledge and beliefs are resistant to change. Because of this, it is important that students be given time necessary for integration of the new material (Hoover, 1996; Hyslop-Margison&Strobel, 2011).

Instruction following the constructivist method does not mean abandoning all traditional instructional tools, such as lecture, which is a viable tool when appropriately used (Hyslop-Margison&Strobel, 2011). Constructivist instruction relies heavily on problem-solving and inquiry-based activities that encourage students to form and test their own ideas, ultimately drawing their own conclusions, which they share in a cooperative learning environment. Throughout this process, the teacher is constantly evaluating student understanding and providing a nudge, when necessary, to consider new ideas or materials to solve problems. Students are able to refine their thinking by being given as many opportunities as possible to practice and apply their newly-gained knowledge (Toh et al., 2004).

14 THEORETICAL BACKGROUND OF CONSTRUCTIVISM

Constructivism emerged in the 1980's and 1990's and was based on the study of human learning in increasingly realistic settings. This philosophy has a long history. The major philosophies behind this theory are of Dewey, Montessori, Piaget, Vygotsky and Novak. Later on Posner 1982, Driver 1989, Novak 1993, and others conducted studies on 'how children construct knowledge' and 'how teacher can provide interventions to help children construct their own concept'. According to the knowledge construction view, the

learner is a sense maker, whereas the teacher is a cognitive guide who provides guidance and modeling on authentic academic tasks.

Constructivism believes that students do not come to the class with 'Tabularasa'- clean slate and their previous experiences, beliefs and ideas affect the interpretations they make of their observations (Driver 1983). Constructivists' and improvement of knowledge based on experiences and observations.

15 BASIC ASSUMPTION AND PRINCIPLES

Its **basic assumptions** could be listed as:

- Knowledge acquisition is a constructive or generative process and each student's knowledge is personal and idiosyncratic (Fisher and Lipson, 1986).
- Students hold intuitive ideas that are both identifiable and stable and have enough commonality to make it worth in planning and instructional strategies (Clough and Driver, 1986).
- Misconception may originate because of students' interaction/experiences with the real world and/or because of her/his misinterpretations of the world of ideas to him (Driver and Easley, 1978).
- Development of alternative frameworks or misconceptions is from the same mechanism that leads to the development of conception. In addition, some modes and sequences of presenting information during teaching may result into development of misconception (Eylon and Lin, 1987).
- Due to their different conceptual ecologies, different students can 'incorporate' the same new experiences/ideas differently in their conceptual structures/frameworks (Jordan, 1987).
- The process of concept formation is a continuous process of successive approximation and refinement (Fisher and Lipson, 1986).

Its **basic principles** listed as:

- Learning is a search for meaning. Hence, learning must start with the issue around which students are actively trying to construct meaning.
- Meaning requires understanding wholes as well as parts. Parts must be understood in the context of wholes. Hence, the learning process focuses on primary concept not isolated facts.

- In order to teach well, the teacher must understand the mental models that students use to perceive the world and the assumptions they make to support those models.
- The purpose of learning for an individual is not just memorizing the 'right' answer but to construct his or her own knowledge.

Brooks and Brooks (1993) opined that there are two basic principles of constructivism. They are as follows:

1. The learner actively assembles what a person knows.
2. Learning serves as an adaptive function of storage of useful information.

1.6 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 intelligence)
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 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.

1.7 HISTORY OF CONSTRUCTIVISM

As long as there were people asking each other questions, we had constructivist classrooms. Constructivism, the study of learning, is about how we all make sense of our world, and that really has not changed (Jacqueline Grennan Brooks (1999)).

Concept of 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 revolution 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 have shaped the foundation of 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 of constructivist learning.

Among all educators, philosophers, psychologists and sociologists who have added new perspectives to constructivist learning theory and practice are Lev Yygotsky, Jerome Bruner, and David Ausubel. Yygotsky 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 changes based on the notion that learning is an active, social processes in which students construct new ideas or concepts based on their current

knowledge. Seymour Papert'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. Bransford, Ernst von Glasersfeld, Eleanor Duckworth, George Forman, Roger Schank, Jacqueline Grennon Brooks, and Martin G. Brooks.

18 SOME CRITICAL PERSPECTIVES

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

1. 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 instruction that is more explicit. In the context, E.D. Hirsch said, "In truth, progressivism didn't work with all 'privileged' kids, just those who had advantages at home or were smart enough to do discovery learning".

2. Constructivism leads to "group think." Critics say that 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 a 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.

19 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. Constructivist 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. Constructivist 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' intellectual 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 emphasized 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.

1.10 SE MODEL

One of the most useful forms of constructivist theory that is used during the teaching process is the SE Model, which is developed, by Rodger W. Bybee in the 1980s, who is among the innovators of BSCS (Biological Science Curriculum Study) and which consists of five phases. These are Engagement, Exploration, Explanation, Elaboration and Evaluation. SE Model is built up on the results of the researches determined at National Science Education Standards.



The five Es is a teaching model, based on piagetian theory, which can be used to implement an implicit constructivist (more specifically neo-Piagetian, human or social-constructivist) view of teaching and learning. It is built around a structured sequence and designed as a tangible and practical way for teachers to implement constructivist theory. It purposefully promotes experiential learning by motivating and interesting students, as they are encouraged to engage in higher-order thinking. Students will become intrinsically in the content presented and therefore motivated to construct meaning for them so that they will be able critically analyze and incorporate new views and different perspectives. Rather, the model provides a tangible referent for teachers to scaffold their developing expertise in structuring a learning environment that will facilitate students' interaction with a learning context in a critical, reflective, and analytical way. The five Es, as such, in an aid or organizer for the teacher to structure and sequence potential with a constructivist view of teaching and learning. In itself, the five Es is not an essential part of student learning. The (Boddy, 2003: Aguilar and Lopez, 2011)

1.11 THEORETICAL BACKGROUND OF SE MODEL

Origin of SE Model can be traced to the philosophy and psychology of the early 20th century. The idea of instructional model is not new but based on the earlier models similar in psychology and philosophy of Johann Herbart, John Dewey, Atkin and Karplus and so on.

1. Herbart's Instructional Model:

According to Johann Friedrich Herbart (1901), a German philosopher, psychology of learning can be synthesized into an instructional model that begins with student's current knowledge and their new ideas that relate to the current knowledge. The connections between prior knowledge and new ideas slowly form concepts.

2. Dewey's Instructional Model:

According to John Dewey (1916) in his theory states that students learn by Directed Living with an emphasis on workshop type project so that learning is combined with concrete activity and practical relevance. In the 1930s an instructional model based on John Dewey's complete act of sense a perplexing situation, clarify the problem, formulate a hypothesis, test the hypothesis, revise tests and act on solutions.

3. Heiss, Obourn & Hoffman Learning Cycle:

Heiss, Obourn & Hoffman (1950), gave their learning cycle which was a variation of John Dewey's instructional model emerged in science methods textbooks. The author based

their "learning Cycle" on Dewey's complete act of thought. The learning cycle includes exploring the unit, getting experience, Organization of learning and application of learning.

4. Atkin-Karplus Learning Cycle:

The Atkin and Karplus (1962) in their learning cycle used the terms exploration, invention and discovery. Exploration refers to relatively unstructured experiences in which students gather new information. Invention refers to a formal statement, often the definition and terms for a new concept. The invention phase allows interpretation of newly acquired information through the restructuring of prior concepts. The discovery phase involves application of the new concept to another, novel situation. During this phase, the learner continues to develop a new level of cognitive organization and attempts to transfer what he or she has learned to new situations. This learning cycle also referred to as SCIS cycle.

5. SE Model:

Rodger W. Bybee (1980), who is among the innovators of BSCS (Biological Science Curriculum Study), developed the SE Instructional model. The BSCS model is a direct descendant of the Atkin and Karplus learning cycle, which was used in the Science Curriculum Improvement Study (SCIS). The BSCS Model has five phases: engagement, exploration, explanation, elaboration and evaluation. At BSCS, there was two additional phases from the SCIS, an initial phase designed to engage the learner's prior knowledge and final phase to evaluate the student's understanding.

1.12 PHASES OF SE MODEL:

New designs for Elementary School Science and Health (BSCS, 1989) describe the phases of the SE instructional model. Phases of the SE model can be applied at several levels in the design of curriculum materials and instructional sequences.

1. ENGAGEMENT:

The teacher or a curriculum task accesses the learners' prior knowledge and helps them become engaged in a new concept with short activities that promote curiosity and elicit prior knowledge. The activity should make connection between past and present learning experiences, expose prior conceptions, and organize students 'thinking toward the learning outcomes of current activities.

2. EXPLORATION:

Exploration experiences provide students with a common base of activities within which current concepts (i.e., misconceptions), processes, and skills are identified and conceptual change is facilitated. Learners may complete lab activities that help them use prior knowledge to generate new ideas, explore questions and possibilities, and design and conduct a preliminary investigation.

3. EXPLANATION:

The explanation phase focuses students' attention on a particular aspect of their engagement and exploration experiences and provides opportunities to demonstrate their conceptual understanding, process skills, or behaviors'. This phase also provides opportunities for teachers to directly introduce a concept, process, or skill. Learners explain their understanding of the concept. An explanation from the teacher or the curriculum from the teacher or the curriculum may guide them toward a deeper understanding, which is a critical part of this phase.

4. ELABORATION:

Teachers challenge and extend students conceptual understanding and skills. Through new experiences, the students develop deeper and broader understanding, more information, and adequate skills. Students apply their understanding of the concept by conducting additional activities.

5. EVALUATION:

The evaluation phase encourages students to assess their understanding and abilities and provide opportunities for teachers to evaluate student progress toward achieving the educational objectives.

1.13 NEED AND JUSTIFICATION OF THE STUDY

Learners constructing knowledge out of their experiences, which are associated with pedagogical approaches that promote active learning, characterize a constructivist-learning environment. (Afolabi & Akinbobola, 2009). Constructivist learning environments place much premium on students' prior knowledge, which is also referred to as alternative framework or alternative conception. According to Neo and Neo (2009), a constructivist learning environment play an important part in achieving meaningful and retentive learning

since it allows students to improve their problem solving, creative thinking and critical thinking skills.

According to Akinbobola and Afolabi (2010) in a constructivist-learning environment, the teachers' role is to serve as the facilitator of learning in which students are encouraged to be responsible, autonomous, and construct their own understanding of each of the scientific concepts. Hence, the activities are learner-centered, democratic, and interactive. The teacher provides students with experiences that allow them to use science process skills. According Thorndike (2000), the teachers' responsibility in a constructivist-learning environment involves taking into account students' prior knowledge and understanding the nature of the concepts to be learned and the learning outcomes expected, conceptual demands made on the child and the strategies available to the teacher.

It is important for teachers to create learning environments, which ensures that students play an active role in their own learning process and access knowledge through investigation, and questioning. Constructivist teaching strategy has been known to create learning environments where the learners are actively involved.

Keeping the above-mentioned facts in view, the pre-service trainee teachers need to know about Constructivism as the most widely accepted pedagogical approach and the latest developments that have taken place in education. As the pre-service trainee teachers are offered 45 days of a glimpse into their professional lives, they are also trained for applying constructivism in their classroom teaching, in which 5E model has surfaced as one of the latest practice for the interns (8. Sc. B. Ed. VII Semester and B. Ed. II Year) of RIE, Bhopal of the batch 2013-14. internship program in teaching was conducted for duration of four weeks for B. Sc. B. Ed. and six weeks for B.Ed. In such a context, it is pertinent to know the attitudes that pre-service teachers developed on 5 E Model of teaching and learning. In addition, it is of utmost important to understand their experiences with regard to the easiness in creating and implementing the learning situations based on 5 E Model. At the same time, it is more than important to understand the challenges that they might have faced in creating and implementing learning situations.

Significance of any research depends on its applicability to bring educational reform. The present study is significant to teacher educators and pre-service trainee teachers to **improve** upon the mistakes that might have occurred during internship. In addition, the findings of the study may help to overcome the dilemmas faced by the present pre-service

trainee teachers in a constructivist teaching- learning approach. This research will help the institute to improve upon the present pedagogical practices of the trainees teachers and may become wide spread across the nation.

1.14 STATEMENT OF THE PROBLEM

"Attitude of pre-service trainee teachers towards SE model of creating learning situation: Achievability and Challenges."

1.15 OPERATIONAL DEFINITION OF THE KEY TERMS

1. **SE Model:** The SE's is an instructional Model based on the constructivist approach to learning, having five phases of teaching: engagement, exploration, explanation, elaboration and evaluation, where each phase has a specific function and contributes to the teacher's coherent instruction and to the learners' formulation of a better understanding of scientific and technological knowledge, attitudes and skills.
2. **Attitude:** Refers to predisposition to perceive feel or behave towards specific objects in a particular manner. However, Attitude for this study is defined as the feelings of the trainee teachers towards the SE Model of creating learning situations.
3. **Achievability:** The extent to which the pre-service trainee teachers perceive that his/her SE Model learning situation has been created and implemented successfully may be defined as achievability in this proposed study.
4. **Challenges:** The extent to which a pre-service trainee teacher perceived the challenges she or he encountered while creating and implementing SE model learning situations may be defined as challenges in this proposed study

1.16 RESEARCH QUESTIONS

The following were the research questions of the present study:

1. What attitude do pre-service trainee teachers have about SE model as a teaching learning approach?
2. Does pre-service trainee teachers' attitude towards SE model of teaching and learning influence their creating and implementation of learning situations?
3. What were the achievability and challenges that pre-service trainee teachers encountered while creating and implementing the SE model of creating learning situation?



1.17 OBJECTIVES OF THE STUDY

The following were the objectives of the present study:

1. To study the attitude of pre-service trainee teachers towards SE model of creating learning situations and influence of attitude of pre-service trainee teachers on preparing and implementing learning situations through SE Model.
2. To study the achievability and challenges that pre-service trainee teachers encountered while preparing and implementing learning situations through SE Model.

1.18 DELIMITATIONS OF THE STUDY

The study has some unavoidable limitations arising out of the constraints of human and physical resources and the time of the investigator. In view of the research constraints under which the study was conducted, it remained confined to the following:

1. Only the Regional Institute of Education, Bhopal was selected for the study.
2. Only B. Sc. B. Ed. VIII sem. and two-year B. Ed. pre-service trainee teachers were selected for the study.
3. Challenges faced in teaching science (namely chemistry and biology) subjects only were considered.

CHAPTER II

REVIEW OF

LITERATURE

CHAPTER II

REVIEW OF RELATED LITERATURE

20 INTRODUCTION

Research takes advantage of the knowledge, which has been accumulated in the past as a constant human endeavor. It can never be taken in isolation of the work that has already been done. The researcher proposes problem that directly or indirectly related to the study. A careful review of the research journal, books, dissertation, thesis and other resourceful information on the problem to be investigated was done so that the proposed study could lead in the direct direction. Avoid duplication, source of the problem of the study, finding gaps. clear pictures of the problem, determining meaning and relationship among variables.

21 IMPORTANCE

Human knowledge has three phases: preservation, transmission and advancement. Practically all-human knowledge could be found in books, journal and papers. Before taking up specific research project in the development of specific research project in the development of a discipline the researcher must be thoroughly familiar with the previous studies.

22 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, 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, Sadaoanthan (2012)**, conducted study on attitude of secondary school teachers towards cooperative learning.

Findings:

1. In the total sample of 180 teachers 45.6% (N=82 total mean 99.9) of teachers showed favorable attitude towards cooperative learning.
2. Age, sex, locality, subject of teaching had strong influence on the attitude towards cooperative learning.
3. 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.

Finding revealed that-

1. A positive effect of this teaching approach on student learning, with a particularly large effect of student engaging in the epistemic and social domains combined.
2. Meta analysis also indicates higher effect sizes for studies that involved teacher led activities.
3. 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 6th in terms of achievement.

Fndings

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.

- **Jayaprabha (2009)**, journal of teacher education and research. Metacognition instruction and achievement in science classroom. Their 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 5th students in geometry. 2) To find out the difference between private schools and government school in achievement of class 5th students in geometry. 3) To find out the gender wise difference on achievement of class 5th students in geometry.

Findings

1. Teaching and learning process through constructivist approach learning situation could definitely help students.
2. There were significant increase in the posttest 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 5th students in geometry of private and government school.

- **Patil (2006)**, the study has investigated achievement in English language of class 6th students 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 class 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 finding 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.

- **Khare (1986)** conducted a study entitled "traditional and structural approaches of teaching English with references 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, 2) 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. 7 achievement tests for seven different dimensions of English were constructed. The following conclusions were drawn: I) the students' achievement under the structural approach was better than those under the traditional method in the areas of spelling, pronunciation and applied grammar.

23 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.

- **Padmanabham(2005)**, studied on effectiveness of constructivist approach on the achievement and problem solving ability in science of 7th 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 aid student learning.

- **Switzer & Shriner (2000)**, mimicking the science process in the Upper-Division Laboratory. *Bioscience*, 50(2), 157-162. In the 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 students 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 interpretative 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 in Science and Society. *Innovations in Education and Training*, 36(1), 53-64.

The author provides 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 author describes results of a study designed to test the effects of the inclusion of peer instruction strategies upon student understanding within large lecture introductory biology courses. It was found that the implemented strategies aided student understanding the 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 Non-traditional AP course. *The American Biology Teacher*, 59(2), 80-84.

Ultimately, 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. In addition, 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 findings 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 outperformed 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 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.

24 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 variable 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 question instructional routines, and understands more deeply the forces that influence their classroom practice.

2.5 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. (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. (2) The reaction of the student and the teacher was favorable.

- **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 based on 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, posttest group design. The data were analyzed by using correlated 't' test and analysis of covariance.

The major findings were:

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

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2.6 STUDIES RELATED TO ATTITUDE TOWARDS TEACHING PROFESSION

Studies on Attitude towards Teaching Profession by **Ramakrishnaiah (1980)**, **Mahapatra (1987)**, **Mathai (1992)** and **Cornelius (2000)** have shown that Attitude towards teaching profession is related to success in teaching. Numerous studies have been conducted particularly in the field of education to explore the effects of attitude of the teacher as well as the effects of different variables on the learning and modification of attitudes. The findings of such studies are summarized below

Studies on attitude towards teaching profession in India

- **Zambare, M, Shobhana (2012)** "A comparative study of Emotional competency and Teacher Attitude of B Ed. trainees towards teaching profession".

Objectives: I.To find out if there is any correlation between emotional competency scores and attitude towards teaching profession of teacher trainees.

- I. To find out the significant differences, if any, in the attitude towards teaching profession of B. Ed trainees in terms of their sex, subject and locality.

Findings: I. There exists a significant relationship between emotional competency and attitude towards teaching profession of B Ed. trainees.

- 2 There exists a significant difference in the mean scores of emotional competence between male and female.
- 3 There exists a significant difference in the mean scores of emotional competency between urban and rural.
- 4 There exists a non significance difference in the mean scores in attitude towards teaching profession between male and female, arts and science and urban and rural B Ed. trainees.

- **Dr. Chandrakant Borse (2012)** "Correlation Study of Self-Concept and Teaching Attitude of B. Ed. teacher trainees".

Objectives: I.To study the correlation between Self-Concept and Teaching Attitude of female B Ed. teacher-trainees.

- 2 To study the correlation between Self-Concept and Teaching Attitude of male B. Ed. teacher-trainees.
- 3 To study the correlation between self-Concept and Teaching Attitude of B. Ed. teacher trainees.

Findings:

- I. There is a significant correlation between the self-concept and teaching attitude of a female teacher-trainee.
2. There is a significant correlation between the self-concept and teaching attitude of a male teacher-trainee.
3. There is a significant correlation between the self-concept and teaching attitude of a 8. Ed. teacher-trainee.

- **Ambasana, Anil (2011)** "University teachers' attitude towards professionalism".

Objectives:

1. To develop an attitude scale to measure attitude towards professionalism.
2. To know the attitude of teachers working in four/five star universities towards professionalism.
3. To find out whether there is any significant difference in attitudes towards professionalism so far as the gender of teachers is concerned.
4. To know whether there is any significant difference in attitudes towards professionalism of teachers working in various faculties.
5. To find out the effect of teaching experience of teachers on their attitude towards professionalism.
6. To check whether there is any significant difference in attitudes towards professionalism of teachers so far as professional and non-professional courses are concerned.

Findings:

1. Average attitude towards professionalism was found reasonably high. Most of the teachers were possessing high attitudes towards professionalism.
2. There was no gender difference in attitudes towards professionalism.
3. Teachers working in various faculties such as social sciences, sciences and linguistics had equally high attitude towards professionalism.
4. There was no difference in the attitude towards professionalism of the teachers imparting professional courses and the teachers imparting non-professional courses.
5. Teaching experience had somewhat significant effect upon teachers' attitude towards professionalism. Teaching experience was positively influencing teacher's attitude towards professionalism particularly up to 20 years. After 20 years, a slight decline was observed in teachers' professionalism attitude.

2.7 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 develops problem solving ability and inquiry based learning in students as this can be observed in Padmanabham (2005), Switzer and Shriner (2005), and Lord (1998).

The constructivist approach also contributes to the development of social interaction, communication skills and social adjustment among the students. To some extent 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 develops 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 researcher.

2.8 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 many studies have been done in the other areas of constructivism teaching and learning and its effectiveness in science. The present study aims to study Attitude of pre-service trainee teachers towards SE model of creating learning situation: Achievability and Challenges.

CHAPTER III

METHODOLOGY

CHAPTER III

METHODOLOGY

3.0 INTRODUCTION

This section deals with the presentation of all the methods implemented to gather data and how the actual research work has been done. In this chapter, the steps of methodology such as selection of the sample, variable of the study, design of the study, administration of the tool, and statistical techniques used for analysis have been discussed. Based on research findings, certain generalization can be made which will provide insights towards the study *Attitude of pre-service trainee teachers towards SE model of creating teaming situation: Achievability and Challenges*. This chapter deals with the methodology to achieve the objectives of the study mentioned in the previous chapter. Keeping in view the nature of the objectives of the study, the 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 both qualitative as well as quantitative, a mixed method in nature. Purposive sampling was used for selection of pre-service trainee teachers of B.Sc. B.Ed and two year B.Ed. The pre-service trainee teachers' attitudes are scored and categorized into positive, negative or neutral, the relationship between the attitude on SE model and the pre-service trainee teachers' narratives on achievability and challenges that they have encountered during their internship is established.

3.2 Variables of the study

3.2.1 Independent Variable

The one variable i.e. attitude on SE model was seen as independent variable which may influence the pre-service trainee teachers narrative; on achievability and challenges

while creating learning situation. Hence, the independent variable is the attitude of pre-service teacher's towards SE model.

3.2.2 Dependent Variable

The dependent variables are achievability and challenges that were explored through the narratives proposed by the participants that will be formed into themes and coded quantitatively. Thus, the proposed study attempts to establish the relationship between attitude on SE model and achievability and challenges that pre-service trainee teachers perceived during their course of internship in teaching.

3.3 Sample

During Internship in teaching, 5 E Model is used as a teaching learning approach which is peculiar to RIE Bhopal. As the internship for pre-service trainee teachers takes place during 2nd year for B. Ed. and during 7th Semester for B. Sc. B. Ed. the entire classes mentioned above have been taken as a sample which amounts to 60 participants, specifically the pre service trainee teachers with a specialization in Biology and Chemistry.

3.4 Tools

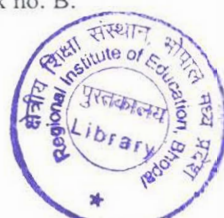
A self-constructed scale was used to study the attitude of pre-service trainee teachers on SE model in accordance with Likert scale (i.e. five-point scale). In order to understand the achievability and challenges, interview schedule was developed.

Attitude scale

A scale was prepared to study the attitude of pre-service trainee teachers towards SE model of creating learning situations and influence of attitude of pre-service trainee teachers on preparing and implementing learning situations through 5E Model. It consisted of 21 test items and instructions directing the pre-service trainee teachers to tick the box in option of starting from strongly agree to strongly disagree. The same is given in appendix no. A.

Interviews

In-depth interviews were conducted with the participants to understand their attitude on achievability of creating and implementing SE Model learning situation and challenges that they had encountered in the process. There were 45 planned and open-ended questions based on the components of 5E model. The same is given in appendix no. B.



3.5 Administration of the tool

The researcher personally met with the participants of B. Sc. B. Ed. and two year B. Ed. for conducting the study and established rapport with them.

Attitude scale

This tool was administered in the very beginning of data collection so the researcher has the idea about participants' attitude towards SE model of constructivism. Prior to the administration of the tool, the participants were explained about the test items, which they supposed to answer. The significance of the tool and the necessary instructions were made clear to them.

In-depth interviews

After having the idea about participants attitude towards SE model of constructivism in-depth interviews were conducted. They were given sufficient time ranging from forty-five minutes to one hour to answer to the queries of the researcher. The answers to the questions were recorded in an audio recorder to be used for further analysis.

3.6 STATISTICAL TECHNIQUE USED

Present study is a mixed type of research; therefore, simple statistics such as Mean and Standard Deviation were used. The statistical techniques used in the study for analyzing the data are given as follows:

1. For studying the attitude of pre-service trainee teachers towards SE model of constructivism, data were analyzed by computing mean and standard deviation respectively.
2. For studying the achievability and challenges that pre-service trainee teachers encountered while preparing and implementing learning situations through SE Model, were analyzed by taking in-depth open-ended interviews.

CHAPTER IV

ANALYSIS OF DATA AND

INTERPRETATIONS OF

RESULTS

CHAPTER IV

RESULTS AND DISCUSSION

4.0 INTRODUCTION

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

OBJECTIVE 1: To study the attitude of pre-service trainee teachers towards SE model of creating learning situations and influence of attitude of pre-service trainee teachers on preparing and implementing learning situations through SE Model.

The first objective is to understand the anitude of pre-service trainee teachers towards SE model of creating learning ituations based on Liken scale. Scores of pre-service trainee teachers were anal_y_zed by computing mean and standard deviation.

Table 4.1: Mean and standard deviation of pre-service trainee teachers score

N	Minimum Score	Maximum Score	Mean	Standard Deviation
60	21	69	50.28	9.16

The total score, which could be obtained by a pre-service trainee teacher in the anitude scale used for the purpose of this research, was 105. From the table 4.1, it can be observed that the mean of all the scores of attitude of pre-service trainee teacher towards SE model was found to be 50.28. The minimum score obtained by a pre-service trainee teacher was 21 and the maximum score was 69.

From the table it can also be seen that the standard deviation for this set of scores signifying the anitude of pre-service trainee teacher toward SE model is 9.16. The discussions for the results found here have been taken up in the objective no. 2.

Based on the data found in table 4.1 three categories were made from the existing pool of pre-service trainee teachers. The categories were found using the formula-

Mean \pm Standard Deviation

These categories were

1. **Positive** towards SE model on constructivism
2. **Neutral** towards SE model on constructivism
3. **Negative** towards SE model on constructivism



Table 4.2: Number of pre-service trainee teachers under different categories

Serial no.	Attitude towards SE Model	Number of pre-service trainee teacher
1	Positive	7 (11.66%)
2	Neutral	41 (68.33%)
3	Negative	12 (20%)
Total		60

From table 4.2 it can be seen that 68.33% (41) pre-service trainee teachers are neutral toward the SE Model of creating learning situations. Again, 20% (12) pre-service trainee teachers were found to have a negative attitude towards SE Model of creating learning situations. A very few 11.66 % (7) of pre-service trainee teachers were found to be sympathetic in their attitude towards SE Model of creating learning situations. The various reasons of their attitude were found using an open-ended interview, the gist of which has been explained in objective 2.

Findings: The following were the findings with regard to Objective 1.

A clear majority 68.33 % (41) of pre-service trainee teachers had a neutral view towards SE Model of creating learning situations. Whereas a few 20 % (12) number of pre-service trainee, teachers held a negative attitude, even fewer 11.66%(7) were in support of SE Model of creating and learning situations.

OBJECTIVE 2: To study the achievability and challenges that pre-service trainee teachers encountered while preparing and implementing learning situations through SE Model.

The above -mentioned Objective required an up and close interview with all the pre-service trainee teachers (participants). Therefore, the researcher constructed an interview schedule, which was recorded like while interviewing the participants and later reviewed to get a general idea of their attitude and the same time an in-depth understanding of the reasons why they held this attitude. A summary of the responses given by various participants has been presented along with the op,m-ended questions, which were put to them.

Q 1: Hi there! How was your internship program?

This question was asked with a view to get a general idea of their in totalum experiences during their internship. The following were the various responses-

- Most of the participants enjoyed their internship program and found teaching through SE Model a unique *meets life* experience.
- Some participants also mentioned that it was an all together exciting event as the SE Model had been implemented in their teaching institution for the first time.
- This internship experience was also a wealth of lifelong learning experience for some participants.
- On the contrary, a few participants felt that it was a period of confusion, as the SE Model was implemented for the first time in the institute hence insufficient training was given to them before going out in the field.

Q 2: Could you please tell me about the process skills that were useful to you in creating and implementing the learning situation?

There are different types of process skills namely: communication, experimentation, observation, classification, inference, critical thinking, reflective thinking, interpretation and problem solving skills. Participants found observation skill and communication skill as one of the most useful skill during their internship program. Some of the participants went so far as to tell the researcher that though these skills were easy to learn they were more so difficult to apply in real classroom situations. This can be attributed according to them, to the fact that they were not well versed with actively using these skills in their life prior to the internship program. However, there were few process skills, which they were not able to implement in the classroom situation, like, critical and reflective skills. In addition, they had many doubts in inference and interpretation skills.

Q 3: Were your learners able to internalize the process skills that you used and were they able to apply them in the classroom situation?

According to a majority of participants the learners were able to internalize the process skills, but at a very superficial level. When asked the reason of this, the responses were as follows:

- Some of the participants were candid enough to confess that they themselves were not very well acquainted with these skills and hence not well equipped with the methods to help the learners internalize them as well.
- In addition to that, it was sadly noted by the researcher that B. Sc. B. Ed. VIII semester was not even oriented on a basic level to the process skills prior to their actual internship period unlike B. Ed. II Year.

Q 4: Among all the 5Es, which stage was easy to create and execute and which stage was problematic? Explain?

The easiest phase according to a majority of participants was **Engage**. The Reasons cited by the participants were-

- It was easier for learners who were habitual to the behaviorist classroom situations to be actively involved in a new method of learning, using teaching aids.
- Engage phase at times brought out the prior knowledge of learners.
- This phase also helped in getting full co-operation and utmost attention of slow learners, mischievous learners and even the ones who were not interested in the classroom process at all.

Evaluation is the phase which majority of the participants found difficult to execute. The reasons cited by them are as follows:

- The rubric was a new concept for the participants hence making them unfamiliar with the process of using it.
- The participants also mention the tediousness of keeping meticulous records of each child impractical and hence they could not successfully execute this stage.
- Group answering was another issue that the participants faced while evaluating as it was difficult to differentiate the level of understanding displayed by a single learner answering in chorus.

Q 5: What were your experiences with the 'Engage' phase?

Engage phase as in response 4 was easy to execute for most of the participants but difficult to organize. The organization part posed a difficulty because many schools did not provide the optimum use of ICT either to the participant or for the use of learners. It was possible for the participants to generate a curiosity among the learners as they had been deprived of a rich learning environment in the traditional classroom setting. The participants provided the researcher with an array of examples where it can be clearly seen that the act of

engaging learners proved to be a successful one. Chosen among them are a few, which have been mentioned below:

- One of the participants, while dealing with the topic of herb and shrubs, generated curiosity in the classroom by bringing actual herb and shrub specimens.
- While dealing with the topic "pollution" in a primary class the participant asked the learners to cite examples of where they experienced polluted environment. The learners were very involved while citing examples such as marriage ceremonies, traffic signals and a unique example of noise pollution-the mixer grinder in kitchen.

Q 6: While executing 'Explore' phase, how did you form groups in the classroom and what were the difficulties you encountered?

The participant came up with the following strategies while forming groups-

- On the onset when the class was not very familiar, the participant opted for random group formation on particular basis.
- As the familiarity increase, the participant tried to make heterogeneous groups with learners of different cognitive abilities.
- Some of the participant ensured leadership among the group to be on a cyclic basis so that equal opportunity was granted to each member of the group to lead as well as to follow.

The participants encounter the following problems while forming groups-

- The classroom physical infrastructure that is the bench arrangement did not allow heterogeneous group formation.
- The seating arrangement in the classroom was random and pre decided. Much of the time was consumed asking the students to change their places according to the groups.
- Affinity and friendship towards certain children in the classroom and hostility towards others made group formation for the participants very difficult.
- The group formation in general was very time taking.
- Most of the classes had a large number of students and hence while forming groups the number of members in each group exceed making discipline a problem.
- Due to the participants' own lack of experience in dealing with groups, it was difficult for them to maintain a constant attention over the entire classroom.

Q 7: What, according to you were the groups learning experiences of the learners I students?

All groups participated during the group discussion. They shared their life experiences with each other related to content and context. The most obvious advantage of this exercise was that the pre-formed groups in the class became very much forgotten and learners enjoyed their heterogeneity. They also found sharing their previous knowledge a very refreshing and satisfying experience with everyone in the class. This phase helped them to socialize more. The learners tried to work in groups by learning to organize and jot down the summary of their group discussions.

The participants also faced certain problems in the group formation phase. At times, the learners were not able to organize the information they had. Some learners were not interested in the group procedures and some others would disrupt group activities if they felt that the group did not give sufficient importance to them. In pre-service trainee teachers' classes but also in permanent faculty classes few learners were not only sleeping, completing their homework or simply looking outside the classroom.

Q 8: During the phase 'Explain' were learners making meaning out of the group discussion. Were they able to explain the concepts in their own words?

Yes, the learners were, with the help of their peers, able to make meaning and organize at first in a raw manner but latter in a more organize manner. At times, the learners would also deviate from the topic, as they would branch away from the main idea.

Examples I: In the chapter Separation of Substances in class VI, the learners explained the concepts of winnowing, sieving, threshing and hand picking etc, based on their group discussion. They were also able to better explain the processes involved and cited various examples from the daily life where these processes were employed. After the discussion, the learners were also able to present their data sequentially.

Example 2: During the learning of chapter Communicable Diseases in class VII the students discussed in a group as to the diseases they and their sibling had. During the discussion, the learners exchanged thoughts on the common diseases they were prone to and tried to trace the origin of these diseases through discussion. While presenting the data the students first talked about the diseases they suffered, their symptoms, and their causes. When probed further the learners even came up with ways to prevent these communicable diseases.

Q 9: As a facilitator, did you help learners in clarifying and modifying their understanding of learning aspect?

Yes, most of the participants were successful in clarifying and modifying learners understanding of learning aspect. The reason that the participants could do so according to them was that the 5E Model makes the learners mind very flexible and ready to accept any change. At times, the learners would misunderstand or not understand at all. In such situation, the participants would gently guide the learners to the proper meaning of the concept.

Being a facilitator the participants made themselves always available to the needs of learners in clarifying doubts and satisfying queries and they would ensure proper encouragement whenever a learner was in need of support to raise doubts.

The learners were occasionally so into the learning that they would bring working models attempted by selves in the classroom and hence encourage others to explore the practicality of the concepts learned in the classroom.

For example: learners of class VI, while learning the chapter Electricity made working models of circuits using conductors and insulators without being asked to do so. They felt highly curious once they understood the concept of electricity flowing like water hence they could not refrain from trying out the activities given in the textbook themselves.

Similarly, another group of learners who were being taught the chapter relating to growth and Development in Plants tried out to observe the Germination of the seeds by keeping black grams etc in wet cotton to practically see what they learnt in the classroom. They brought their germinated seed in the classroom, which was a cause of much hype and further questions raised by learners.

Q 10: What are the difficulties that you faced during the phase of elaborate? Explain your observation.

The participants on a whole, pointed out to lack of time left during the period as the greatest difficulty. Most of the participants could not save enough time from the three previous phases to conduct the elaborate phase successfully. The time was less owing to various factors such as-

- Too much time in grouping.
- If the groups were large, explain phase took more than the usual time.
- Many questions would be raised which would deviate from the topic and would take a considerable amount of time for the whole discussion to be brought home.
- Extra time taken by the teachers prior to the trainee teachers' period.

Q 11: Were learners able to apply the new concept learnt to real life situation especially in terms of critical and reflective thinking among learners?

According to participants, the SE Model is an extremely useful and potent approach in developing critical and reflective thinking among learners. The participants observed various indicators where they identified critical and reflective thinking among learners.

For example:

- While learning about fire extinguishers a very observant learner ask the participant the reason due to which the spray coming out of deodorants catches fire when brought near a flame.
- Another learner while learning about rainbows had a very simple question-why is the rainbows in the shape of an arc?
- A learner while learning about respiration in humans asked the participants -why is particularly oxygen essential for our respiration? What makes oxygen different from other gases?
- While studying the chapter Metals and Non-metal, the learners were inspired to cite examples of rusting from their daily lives. Learners came up with some very interesting example such as-bathroom doors are nowadays made of fibers.
- Learners were able to link two chapters Microorganism: Friend or Foe; and Changes around us and hence were able to explain the Chemical Changes in turning milk to curd by citing the microorganism responsible for it.
- Learners were able to link the concept of "indicators" to their daily lives while studying the chapter Acid and Bases -by identifying "haldi" (turmeric) as an indicator.

Q 12: Could you please highlight the issues that were problematic and the issues that were satisfactory throughout 5 E model of learning situation in details!

Being a new method, the participants faced a number of problems in implementing SE Model of creating learning situation. These problems have been briefly discussed below:

1. Problems with SE Model:

- a. During the phase Evaluate, the participants faced a number of problems like insufficient time allotment, lack of proper acquaintance-ship with Rubrics, confusion in understanding specific terminologies in rubrics, inability in preparing rubrics due to lack of sufficient pre-internship training.
- b. As the learners were used to behaviorist approach of teaching -learning they would respond to question of evaluation in a bookish manner despite being

discouraged of the same. The participants also confess to not being able to ask application level question or domain specific question.

- c. The participants also encountered a problem in evaluating the learners when they would give collective answers. It took a lot of discipline and patience for the learners to learn and wait for their turn.
- d. The participants faced a problem in evaluating divergent and critical thinking, however impressive it might be, as most of them evaluated the learners in the achievement test manner.
- e. Evaluation was a problem when the class consisted of more than forty children.
- f. Some of the students had communication problems, as they were too shy to interact with the different teachers. This created a problem in oral evaluation of student.
- g. Rubric was every participant's bone of contention as it was very difficult to be executed in the Indian context of classrooms consisting of fifty to sixty learners.

2. Problem with Physical infrastructure

- a. SE Model requires at times the use of multimedia and ICT. Some of the schools to which the participants were sent to did not have this facility freely available.
- b. Traditional classroom have the row wise seating arrangement, which posed a significant problem for the participants while making groups.
- c. Learners, not used to the constructivist classroom setting, were bound to the teacher for instructions, and could not function properly at all without the participant's instructions and continuous disciplinary monitoring.
- d. Time proved to be the biggest issue in implementing the SE model of creating learning situations. The traditional 35 to 40 minutes of classroom time was mostly wasted away in forming groups or explaining instructions. Most of the participant pointed out to the rarity of being able to complete a single lesson with all 5Es implemented in the same period.
- e. The regular teachers were not very supportive of the new approach of teaching-learning as they felt inferior to it, and were of the opinion that it isn't a very practical approach in the Indian context where to finish the syllabus was the paramount for a teacher.



Q 13: How practical in your opinion is the SE Model of teaching in the Indian context?

This question elicited the strongest responses from all the participants. The problems faced by them in the SE model condensed to their understanding of it in the single question of applicability and validity in the Indian context. The majority of the participants were of the opinion that SE model is not at all suitable to the Indian context. The following were the responses of the participants when asked about the reality of SE and the Indian Education System.

- Only a few of the respondents were convinced of SE model's practicality in Indian Education. They had the reservation that this model is suitable only for pre-primary and primary learners, because the content in this standard allows for greater options and variety in implementing the SEs.
- According to the participants, it was a very difficult, if not impossible job, to change the perception of learners used to traditional teaching of chalk and talk to a new and more diverse form of learning. As most of the participants had themselves been a part of the traditionally taught class of learners, they had problems themselves accepting, implementing and training themselves for an altogether different pedagogical approach.
- Lack of proper pre-internship training by the institution was cited as a major deterrent in successfully implementing the SE model of creating learning situation.
- The physical infrastructure was not supportive of implementing the SE model of creating learning situations; right from the arrangement of the benches to availability of the instructional materials to evaluation procedure.

Q 14: Is teaching through SE effective in all children of all age groups? Why not?

All the participants held the opinion that teaching through the SE model was not well suited for the children of all age groups. They cited the following reasons for their opinion.

- Children in higher classes of today are used to the behaviorist approach of teaching learning, and hence not flexible enough to learn through the new approach.
- The content, as it grows abstract, it is more difficult to be taught using the SE model of teaching.
- The learners are used to mugging up the answers rather than making meaning of what they learn. To inculcate a habit like reflective and critical thinking is a work best done when young.

- Higher classes do not have the patience and curiosity to learn a new topic, as learners are constantly being pushed in the rat race of competitive examinations, most of which check their knowledge acquisition skills and not knowledge construction skills.

4.3 DISCUSSION

A clear majority 68.33 % (41) of pre-service trainee teachers had a neutral view towards SE Model of creating learning situations. Whereas a few 20 % (12) number of pre-service trainee, teachers held a negative attitude, even fewer 11.66%(7) were in support of SE Model of creating and learning situations.

As the SE Model of constructivism have five phases i.e., engage, explore, explain, elaborate and evaluate. Out all these phases the participants found some phases difficult and some easy. Participants found engage phase as one of the easiest phase because of many reasons: it were easier for learners who were habitual to the behaviorist classroom situations to be actively involved in a new method of learning, using teaching aids. Also at times, this phase brought out the prior knowledge of learners and one important aspect of this phase is that it helped in getting full co-operation and utmost attention of slow learners, mischievous learners and even the ones who were not interested in the classroom process at all.

In the next phase i.e., Explore, participants used different strategies for the formation of heterogeneous group. In the beginning when participants were not very familiar with the learners, they opted for random group formation but as the familiarity increases, the participants tried to make heterogeneous groups with learners of different cognitive abilities. In this phase participants stumble upon few problems like classroom physical infrastructure, seating arrangement of learners, learners friendship and hostility toward other learners and most important this phase is time taking.

During explain phase, the learners were able to make meaning and organize at first in a raw manner but latter in a more organize manner. At times, the learners would also deviate from the topic, as they would branch away from the main idea. In the next phase i.e. elaborate; the participants on a whole, pointed out to lack of time left during the period as the greatest difficulty and most of the learners could not save enough time from the previous phases to conduct the elaborate phase successfully.

In the last phase, Evaluate, participants considered it as the bone of contention due to various reasons like insufficient time allotment, lack of proper acquaintance-ship with

rubrics, confusion in understanding specific terminology in rubrics, inability in preparing rubrics due to lack of sufficient pre-internship training, encountered a problem in evaluating the learners when they would give collective answers, it took a lot of discipline and patience for the learners to learn and wait for their tum.

The participants faced a problem in evaluating divergent and critical thinking, however impressive it might be, as most of them evaluate the learners in the achievement test manner, it is also a problem when the class consisted of more than forty learners.

CHAPTER
SUMMARY, CONCLUSION AND
SUGGESTIONS

CHAPTER V SUMMARY



In this chapter, a brief summary of the study is presented under relevant headings. This chapter concludes with implications of the study and suggestion for further research.

5.1 NEED AND RATIONALE OF THE STUDY

A constructivist learning environment is characterized by learners constructing knowledge out of their experiences which are associated with pedagogical approaches that promote active learning. (Afolabi & Akinbobola, 2009). Constructivist learning environments place much premium on students' prior knowledge which is also referred to as alternative framework or alternative conception. According to Neo and Neo (2009), a constructivist learning environment play an important part in achieving meaningful and retentive learning since it allows students to improve their problem solving, creative thinking and critical thinking skills.

According to Akinbobola and Afolabi (2010) in a constructivist learning environment, the teachers' role is to serve as the facilitator of learning in which students are encouraged to be responsible, autonomous, and construct their own understanding of each of the scientific concepts. Hence, the activities are learner-centered, democratic, and interactive. The teacher provides students with experiences that allow them to use science process skills. According Thorndike (2000), the teachers' responsibility in a constructivist-learning environment involves taking into account students' prior knowledge and understanding the nature of the concepts to be learned and the learning outcomes expected, conceptual demands made on the child and the strategies available to the teacher.

It is important for teachers to create learning environments, which ensures that students play an active role in their own learning process and access knowledge through investigation, and questioning. Constructivist teaching strategy has been known to create learning environments where the learners are actively involved.

Keeping the above-mentioned facts in view, the pre-service trainee teachers need to know about Constructivism as the most widely accepted pedagogical approach and the latest developments that have taken place in education. As the pre-service trainee teachers are offered 45 days of a glimpse into their professional lives, they are also trained for applying constructivism in their classroom teaching, in which SE model has surfaced as one of the latest practice for the interns (B. Sc. B. Ed. VII Semester and B. Ed. II Year) of RIE, Bhopal of the batch 2013-14. Internship program in teaching was conducted for duration of four

weeks for B.Sc. B. Ed. and six weeks for 8. Ed. In such a context, it is pertinent to know the attitudes that pre-service teachers developed on S E Model of teaching and learning. In addition, it is of utmost important to understand their experiences with regard to the easiness in creating and implementing the learning situations based on 5 E Model. At the same time, it is more than important to understand the challenges that they might have faced in creating and implementing learning situations.

Significance of any research depends on its applicability to bring educational reform. The present study is significant to teacher educators and pre-service trainee teachers to improve upon the mistakes that might have occurred during internship. In addition, the findings of the study may help to overcome the dilemmas faced by the present pre-service trainee teachers in a constructivist teaching- learning approach. This research will help the institute to improve upon the present pedagogical practices of the trainees teachers and may become wide spread across the nation.

5.2 STATEMENT OF THE PROBLEM

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The problem for the present study was worded as:

Attitude of pre-service trainee teachers towards SE model of creating learning situation: Achievability and Challenges.

5.3 OPERATIONAL DEFINITION OF TERMS

1. **SE Model:** The SE's is an instructional Model based on the constructivist approach to learning, having five phases of teaching: engagement, exploration, explanation, elaboration and evaluation, where each phase has a specific function and contributes to the teacher's coherent instruction and to the learners' formulation of a better understanding of scientific and technological knowledge, attitudes and skills.
2. **Attitude:** Refers to predisposition to perceive feel or behave towards specific objects in a particular manner. However, Attitude for this study is defined as the feelings of the trainee teachers towards the SE Model of creating learning situations.
3. **Achievability:** The extent to which the pre-service trainee teachers perceive that his/her SE model learning situation has been created and implemented successfully may be defined as achievability in this proposed student.
4. **Challenges:** The extent to which a pre-service trainee teacher perceived the challenges she or he encountered while creating and implementing SE model learning situations may be defined as challenges in this proposed study.

5.4 OBJECTIVES OF THE STUDY

The following were the objectives of the present study:

1. To study the attitude of pre-service trainee teachers towards SE model of creating learning situations and influence of attitude of pre-service trainee teachers on preparing and implementing learning situations through SE Model.
2. To study the achievability and challenges that pre-service trainee teachers encountered while preparing and implementing learning situations through SE Model.

5.5 DESIGN OF THE STUDY

A research design is a plan, structure and strategy of investigation so conceived as to obtain answers to research questions or problems. The plan is the complete scheme or program of the research. It includes an outline of what the investigator will do from writing the hypotheses and their operational implications to the final analysis of data (Kerlinger 1986).

The present study is both qualitative as well as quantitative, a mixed method in nature. Purposive sampling was used for selection of pre-service trainee teachers of B. Sc. B. Ed. and two years B. Ed. The pre-service trainee teachers' attitudes have been scored and categorized into positive, negative or neutral (favorable, unfavorable or indifferent) the relationship between the attitude on SE model and the pre-service trainee teachers' narratives on achievability and challenges that they have encountered during their internship was established.

5.6 SAMPLE OF THE STUDY

During Internship in teaching, SE Model is used as a teaching learning approach which is peculiar to RIE Bhopal. As Internship for pre-service trainee teachers, take place during 2nd year for B. Ed. and during 7th Semester for B.Sc.-B. Ed. with a specialization in Biology and Chemistry. The entire classes mentioned above are taken as a sample that amounts to 60 participants. In order to understand each case as what achievability and challenges that they have faced while creating and implementing teaching situations.

5.7 TOOLS USED IN THE STUDY

A self-constructed scale was used to study the attitude of pre-service trainee teachers on SE model in accordance with Likert scale (i.e. five-point scale). In order to understand the achievability and challenges, interview schedule was developed.

Attitude scale

A scale was prepared to study the attitude of pre-service trainee teachers towards SE model of creating learning situations and influence of attitude of pre-service trainee teachers on preparing and implementing learning situations through SE Model. It consisted of 21 test items and instructions directing the pre-service trainee teachers to tick the box in option of starting from strongly agree to strongly disagree.

Interviews

In-depth interviews were conducted with the participants to understand their attitude on achievability of creating and implementing SE Model learning situation and challenges that they had encountered in the process. There were 15 planned and open ended questions based on the components of SE model.

5.8 PROCEDURAL DETAILS OF THE STUDY

The researcher personally met with the participants of B. Sc. B. Ed. and two year B.Ed. for conducting the study and established rapport with them.

Attitude scale

This tool was administered in the very beginning of data collection so the researcher has the idea about participants' attitude towards SE model of constructivism. Prior to the administration of the tool, the participants were explained about the test items, which they suppose to answer. The significance of the tool and the necessary instructions were made clear to them.

In-depth interviews

After having the idea about participants attitude towards SE model of constructivism in-depth interviews were conducted. They were given sufficient time ranging from forty-five minutes to one hour to answer to the queries of the researcher. The answers to the questions were recorded in an audio recorder to be used for further analysis.

5.9 STATISTICAL TECHNIQUES USED

The statistical techniques used in the study for analyzing the data are given as follows:

1. For studying the attitude of pre-service trainee teachers towards SE model of constructivism, data were analyzed by computing mean and standard deviation respectively.

2. For studying the achievability and challenges that pre-service trainee teachers encountered while preparing and implementing learning situations through SE Model, were analyzed by taking in-depth open-ended interviews.

5.10 MAJOR FINDINGS OF THE STUDY

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

1. A clear majority 68.33 % (41) of pre-service trainee teachers had a neutral view towards SE Model of creating learning situations. Whereas a few 20 % (12) number of pre-service trainee, teachers held a negative attitude, even fewer 11.66%(7) were in support of SE Model of creating and learning situations.
2. During the phase Evaluate, the participants faced a number of problems like insufficient time allotment, lack of proper acquaintance-ship with Rubrics, confusion in understanding specific terminologies in rubrics, inability in preparing rubrics due to lack of sufficient pre-internship training.
3. As the learners were used to behaviorist approach of teaching -learning they would respond to question of evaluation in a bookish manner despite being discouraged of the same. The participants also confess to not being able to ask application level question or domain specific question.
4. The participants also encountered a problem in evaluating the students when they would give collective answers. It took a lot of discipline and patience for the learners to learn and wait for their turn.
5. The participants faced a problem in evaluating divergent and critical thinking, however impressive it might be, as most of them evaluated the learners in the achievement test manner.
6. Evaluation was a problem when the class consisted of more than forty children.
7. Some of the students had communication problems, as they were too shy to interact with the different teachers. This created a problem in oral evaluation of student.
8. Rubric was every participant's bone of contention as it was very difficult to be executed in the Indian context of classrooms consisting of fifty to sixty learners.

- **Problem with Physical infrastructure**

- ❖ SE Model requires at times the use of multimedia and ICT. Some of the schools to which the participants were sent to did not have this facility freely available.
- ❖ Traditional classroom have the row wise seating arrangement, which posed a significant problem for the participants while making groups.
- ❖ Learners, not used to the constructivist classroom setting, were bound to the teacher for instructions, and could not function properly at all without the participant's instructions and continuous disciplinary monitoring.
- ❖ Time proved to be the biggest issue in implementing the SE model of creating learning situations. The traditional 35 to 40 minutes of classroom time was mostly wasted away in forming groups or explaining instructions. Most of the participant pointed out to the rarity of being able to complete a single lesson with all SEs implemented in the same period.
- ❖ The regular teachers were not very supportive of the new approach of teaching-learning as they felt inferior to it, and were of the opinion that it isn't a very practical approach in the Indian context where to finish the syllabus was the paramount for a teacher.

5.11 EDUCATIONAL IMPLICATION OF THE STUDY

SE Model is the model, which is based on research-oriented constructivist learning theory and experimental activities. SE Model, while including students in activity at every phase, encourages learners to constitute their own concepts. It includes skills and activities that increase curiosity for research, satisfy learners' expectations, and make learner focus on an active research for information and understanding. Learners use their previous knowledge in discovering new concepts for the concepts to gain a meaning.

Present study is significant to teacher educators and pre-service trainee teachers to improve upon the mistakes that might have occurred during internship. In addition, the findings of the study may help to overcome the dilemmas faced by the present pre-service trainee teachers in a constructivist teaching- learning approach. This research will help the institute to improve upon the present pedagogical practices of the trainees teachers and may become wide spread across the nation.

5.12 DELIMITATIONS OF THE STUDY

The study has yielded some important and interesting findings. However, the study has some unavoidable limitations arising out of the constraints of human and physical resources and the time of the investigator. In view of the research constraints under which the study was conducted, it remained confined to the following:

1. Only the Regional Institute of Education, Bhopal was selected for the study.
2. Only B. Sc. 8.Ed. VIII sem. and two year 8.Ed. pre-service trainee teachers were selected for the study.
3. Challenges faced in teaching science (namely chemistry and biology) subject only were considered.

5.13 SUGGESTIONS FOR FURTHER STUDIES

Looking into the constraints under which the study was conducted, the findings do not warrant wide generalizations. It is therefore, felt that replication of this study, on a larger sample, and is requisite to arrive at precise results. However, studies may be undertaken on the following topics:

1. This study can be conducted on pre-service trainee teachers of 8. A. 8. Ed course.
2. This study can be conducted on pre-service trainee teachers of 8. Sc. 8. Ed in subjects other than biology and chemistry.
3. This study can be conducted longitudinally on a batch of next five to ten final year pre-service trainee teachers.
4. Similar study can be conducted on pre-service trainee teachers of other Educational Institute.
5. This study can be conducted taking gender as a variable.
6. A comparative study between pre-service and in-service trainee teachers can be undertaken to know about their perceptual differences over 5E Model of creating learning situation.



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APPENDICES

A. Attitude Scale of Constructivist Approach for Pre-Service Science Teachers

Name:

Gender:

Age:

Course:

S.No	TEST ITEMS	STRONGLY AGREE	AGREE	NOT SURE	DISAGREE	STRONGLY DISAGREE
1.	SE model of creating learning situation made your Internship in teaching program very interesting.					
2.	SE model of Constructivist approach helps student to understand the essence of the subject.					
3.	SE model of Constructivist approach enhances student's self-confidence.					
4.	I think SE model of constructivist approach has no effect on learning science.					
5.	SE model of Constructivist approach gives students feeling of responsibility.					
6.	SE model of Constructivist approach decreases students' interest towards lessons.					
7.	SE model of Constructivist approach facilitates students' learning.					
8.	SE model of Constructivist approach increases the interaction between the teacher and student.					
9.	SE model of Constructivist approach decreases the interaction among students					
10.	SE model of Constructivist approach enables students to relate knowledge with life experiences					
11.	SE model of Constructivist approach assures a learning environment in which all the students are eager to learn.					

12.	Applying the SE model of constructivist approach in Science lesson, in particular biology and chemistry, is effective for students in attaining knowledge.					
13.	SE model of Constructivist approach gives the student a chance to evaluate themselves.					
14.	Creating constructivist environment is <i>very hard</i> in the Indian schooling context.					
15.	SE model of Constructivist approach is <i>not suitable</i> for the circumstances of our country.					
16.	SE model of Constructivist approach is not appropriate for the present socio-economic level of our country.					
17.	Being a teacher in SE model of constructivist approach is difficult.					
18.	Incorporating SE model of constructivist approach is not suitable for crowded classrooms.					
19.	A lesson plan based on SE Model of constructivist approach is not possible to be completed in the stipulated time of forty minutes of a classroom.					
20.	SE model is a 'difficult-to-apply' approach in the classroom.					
21.	The evaluation of students is troublesome in SE model of constructivist approach.					

INTERVIEW

B. Interview Schedule for Teacher Trainees to explore the feasibilities and challenges in creating and implementing Learning Situations based on 5E model of Constructive approach of teaching and learning.

Name of the Teacher Trainee:

Course:

Gender:

Age:

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Q 1: Hi there! How was your internship program?

Q 2: Could you please tell me about the process skills that were useful to you in creating and implementing the learning situation?

Q 3: Were your learners able to internalize the process skills that you used and were they able to apply them in the classroom situation?

Q 4: Among all the 5Es, which stage was easy to create and execute and which stage was problematic? Explain?

Q 5: What were your experiences with the 'Engage' phase?

Q 6: While executing 'Explore' phase, how did you form groups in the classroom and what were the difficulties you encountered?

Q 7: What, according to you, were the groups learning experiences of the learners/students?

Q 8: During the phase 'Explain' were learners making meaning out of the group discussion. Were they able to explain the concepts in their own words?

Q 9: As a facilitator, did you help learners in clarifying and modifying their understanding of learning aspect?

Q 10: What are the difficulties that you faced during the phase of elaborate? Explain your observation.

Q 11: Were learners able to apply the new concept learnt to real life situation especially in terms of critical and reflective thinking among learners?

Q 12: Could you please highlight the issues that were problematic and the issues that were satisfactory throughout 5E model of learning situation in details!

Q 13: How practical in your opinion is the 5E Model of teaching in the Indian context?

Q 14: Is teaching through 5E effective in all children of all age groups? Why not?

