



7E MODEL: AN EFFECTIVE INSTRUCTIONAL APPROACH FOR TEACHING LEARNING

Ms. Shaista Rahman¹, Dr. Rekha Chavhan²

¹Research Scholar, Department of Education, SNDT Women's University, Mumbai, India

²Assistant Professor, Department of Education, SNDT Women's University, Mumbai, India

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ABSTRACT

7E model developed by Eisenkraft (2003) is an inquiry-based instructional model based on the theory of constructivism. The seven stages of this constructivist-based learning cycle model are Elicit, Engage, Explore, Explain, Elaborate & Evaluate and Extend. The present paper is intended to explore the historical background of constructivist 7E Model, the phases of the 7E learning cycle model, role of teacher and the students in the 7E model, the advantages of the 7E Model of learning and implications for using constructivist 7E model to facilitate teaching and learning. The researcher has found 7E Model very effective both for teachers and students and has recommended that teachers should be encouraged to use the 7E learning cycle model in their classrooms for effective teaching-learning.

KEYWORDS: 7E Learning Cycle Model, Constructivist Approach, Effective Teaching-Learning

1. INTRODUCTION

In recent years, there has been tremendous demand for student-centered learning methods. The constructivist approach is one of them. According to this approach, people construct their understanding and knowledge of the world, through experiencing things and reflecting on those experiences (Bereiter, 1994). Since constructivism believes that the students construct new knowledge on top of their prior knowledge, it becomes very essential for the teacher to access the prior knowledge of the students before introducing any new concept. Failure to do so may result in students developing concepts very different from the ones the teacher intends (Bransford, Brown, and Cocking 2000).

Several instructional strategies have been derived from constructivist learning theory. The learning cycle is an inquiry-based instructional strategy based on the theory of constructivism. Various learning cycle models have been put forward starting from 3E to 7E. In the recent past, Kaur & Gakhar (2014) proposed the 9E model which is an enhancement to the 7E teaching and learning model. Each 'E' letter in the learning cycles stands for the capital letters of English

words which indicates phases of the learning process (Bybee et al., 2006). The current study discusses the 7E learning cycle model developed by Eisenkraft (2003).

2. PURPOSE OF THE STUDY

- To discuss the historical background of the 7E Model
- To explain the phases of 7E learning cycle model
- To describe the role of teacher and students in the 7E model
- To assess the advantages of the 7E Model of learning
- To draw implications for using constructivist 7E model to facilitate teaching and learning

3. HISTORICAL BACKGROUND OF THE 7E LEARNING CYCLE MODEL

Although the idea of instructional models are not new, their application and use has increased dramatically in recent years (Bybee et al., 2006). Different variants of constructivism based instructional models have come up over the years with a difference



in the no of phases. Settlage (2000) stated in this context that the difference in number of phases do not

matter as their central goal is same.

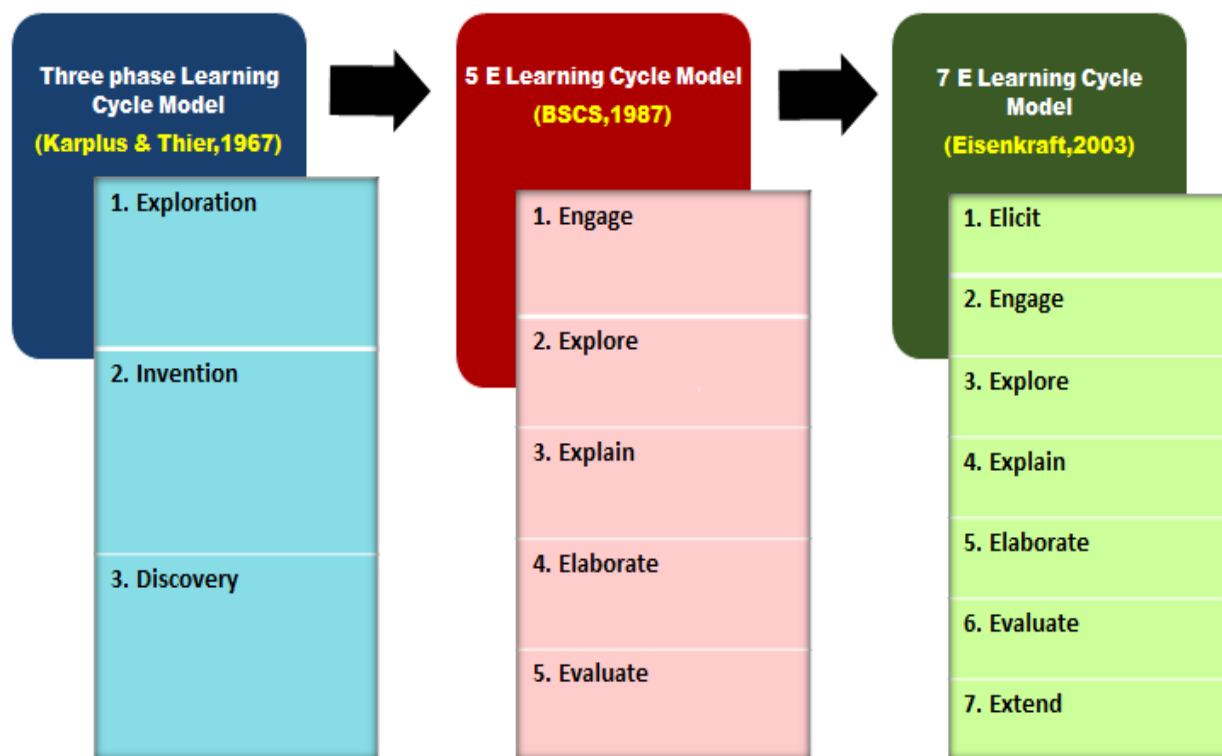


Fig 1. A brief history of 7E Model

The first version of learning cycle model consisted of three phases was introduced by Karplus & Their (1967) for the Science Curriculum Improvement Study (SCIS). This three-phase learning cycle included the phase of Exploration, Invention, & Discovery. Later in 1980s, the two terms of the 3-phase learning cycle were modified by Lawson. The term “Invention” was modified into “Term Introduction” & “Discovery” was amended into “Concept Application.” From three phases different versions of the learning cycle model have evolved such as four, five, seven and even nine. The 5E Instructional Model was created in 1987 by Biological Science Curriculum Study (BSCS) consisted of five E’s -Engage, Explore, Explain, Elaborate & Evaluate. The 7 E model developed by Arthur Eisenkraft (2003) is basically an expansion of the 5 E

model. The 7E model consists of seven phases of instruction within the learning cycle- Elicit, Engage, Explore, Explain, Elaborate & Evaluate and Extend.

4. THE 7E LEARNING CYCLE MODEL (EISENKRAFT, 2003)

7E learning cycle model is a useful recommended instructional approach in science curriculum and in today’s science curriculum scenario, the instructors or the teachers should be encouraged to incorporate this model into their teaching (Balta & Sarac, 2016). Eisenkraft (2003) proposed the phases of the 7E learning cycle model as follows- Elicit, Engage, Explore, Explain, Elaborate, Evaluate, and Extend.

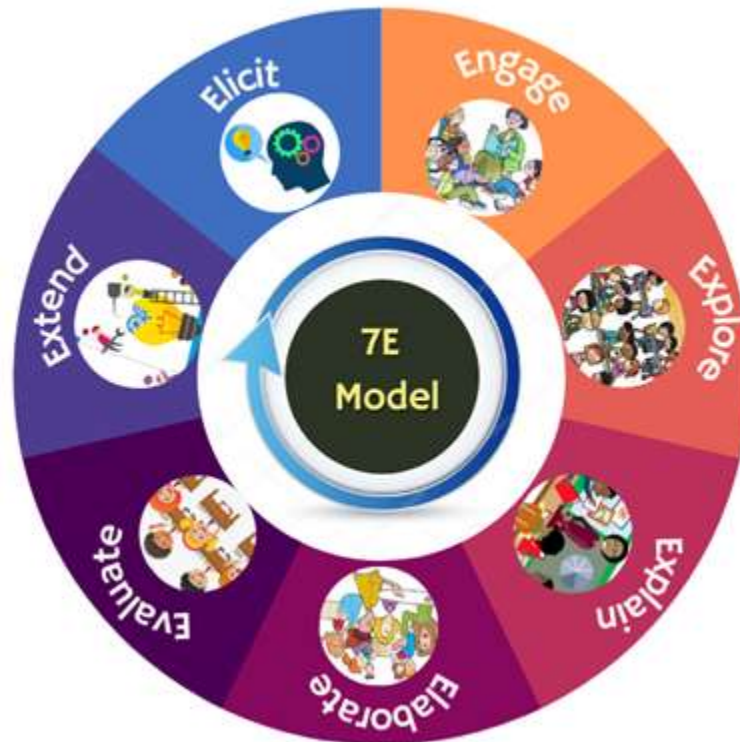


Fig 2. The 7E Learning Cycle Model

Elicit: The objective of the first phase of the learning cycle is to determine what the students already know about the about the concept to be taught. The teacher can access the prior knowledge of the students through Questioning, KWL chart, incomplete concept maps, concept cartoons, activity sheets etc. The teacher also tries to track down if any misconceptions students have about the subject.

For example, to find out the students' previous knowledge on the topic- "Water pollution", the teacher can ask questions like-

What happens when harmful substances enter into water bodies & get dissolved in them?

Why is it important to save water?

What are the various sources of water contamination?

Answers coming from students will disclose their knowledge about water & its contamination.

Engage: The motive of this phase is to get the students mind focused on the topic. The teacher arouses interest and stimulates the curiosity of the students towards learning the subject matter so that they become ready to give all their attention on the contents taught.

E.g. To gain the students' attention on the topic - "Water pollution", the teacher can tell them a story or show them a video or diagram or a small science activity on water pollution and can ask a few questions based on the material presented. This way students will

get to know the importance of clean water for human beings and will be naturally motivated to learn.

Explore: The purpose of this phase is to provide the students with a common experience. The students get involved in the topic directly, explore the concept themselves which help them build their own understanding and realize the unsatisfactory explanations in their minds. Teacher work only as a consultant for the students whereas student role is active in this phase. The students are encouraged to work together in collaborative & cooperative manner. They share their experiences, observations and findings with their peer group. The tasks and discussions provide them a chance to achieve a better understanding of the concept. Involving the students to work together in activities develop teamwork, cooperative learning skills and helps them in the process of sharing and communicating.

E.g. The teacher can divide the students in three groups with names cause, effect & solution.

Students in group-I will explore the Causes of water pollution, group-II will explore the Effects of water pollution and group-III will explore ways for the prevention and control of water pollution with the resources or study guides provided by the teacher. After sometime each group can be asked to give a brief presentation of their topics before the other two groups.



Each presentation can be further followed by peer group discussion. The teacher will encourage the students to ask questions based on the information presented to know their understanding & to reveal if any misconceptions they have related to the concept.

Explain: In this phase, students discuss and express their conceptual understandings with the teacher and their classmates. Both teacher and the students actively participate in this phase. The teacher needs to question based on the information provided while explaining the subject matter to examine students' understanding, to induce their thinking & to ensure that the concepts are correctly formed in students' minds.

The teacher explains the whole concept by making connections between students' understanding and examples from the living world.

E.g. The teacher encourages the students to explain the concept of water pollution in their own words to know their level of understanding of the concepts. The teacher can ask students questions based on the information provided & can also ask for clarification & justification from the students if required. Then the teacher explains the whole concept of water pollution-its causes and effects and solutions by connecting students' explanations with scientific clarifications and examples from the nature.

Elaborate: In this phase students gets the opportunity to apply the information learned in the 'Explain' phase. This benefits the students' in extending their conceptual understanding about the concept taught. Related activities or experiments can be shown to the students to get a deeper understanding of the concept. Students' previous understanding helps them ask more questions, arrive at solutions, and will be able to draw a rational conclusion from the evidence.

E.g. During this phase students will get the opportunity to enhance their understanding of concepts about water pollution control & the importance of clean water for healthy living. They will learn to clean "dirty water sample" by water treatment steps using supplies that are easily available at home.

The teacher can divide the students in three groups (Group 1-Coagulation and Sedimentation, Group 2-Filtration & Group 3- Disinfection). Each group will represent a water treatment step and they will be asked to perform water treatment by using supplies that are available at home. To begin the investigation, teacher will provide them a "dirty water sample" collected from the local pond. The first group will use Alum for cleaning of water sample. The second group will use gravel & sand for filtration & the third group will add chlorine in the dirty water sample to disinfect it. After few minutes each group will share their experiences with other two groups & with the teacher. This activity

will encourage them to think critically on the impurities present in the water & consequences of consuming dirty water on human health. It will also help them develop concern for keeping the water clean.

Evaluate: Both process as well as product of student learning are examined through this phase. The teacher uses rubrics, checklist, observation sheets, self-assessment, peer-assessment, writing assignments, and other formative as well as summative evaluation techniques to guide students learning. The teacher assesses if the students' have attained an understanding of concepts or not. In this model evaluation is an ongoing diagnostic process which goes beyond testing correct answers only for passing a grade.

E.g. The teacher will use questioning throughout the lesson to reveal the student understanding (or insufficient knowledge) about the concept. The teacher can give them a short-written quiz consisting of open-ended questions on the water pollution to determine the extent to which the students have learned the concepts. Self-assessment sheets can also be given to encourage the students to assess their own learning.

Extend: In this phase, students apply the concepts learned in real-world situations. Transfer of learning to a new context enhances their conceptual understanding. E.g. The teacher can give them an activity to make "water pollution awareness" posters from the newspaper cuttings. The teacher will divide the students in groups of 5 or 6 students (or as appropriate), and involve them in collecting and arranging the newspaper cuttings according to the news items which shows the issues related to water pollution & displaying them on a big piece of cardboard that can be put up on the wall. From this activity, the students will be able to create and develop awareness on the issues concerning water pollution. They will also be able to develop critical thinking, task orientation, team work and social skills.

5. ROLE OF TEACHER & STUDENTS IN 7E MODEL

The role of the teacher here is not giving lecture to students but working as facilitator or a guide for them. The teacher encourages the students to participate actively in the process of learning and motivates them to work together collaboratively and cooperatively. The teacher makes sure he/she understands the students' preexisting conceptions and guides the activity to address them and then build on them (Oliver, 2000). The teacher has the responsibility to adjust, modify, restructure and re-plan the teaching-learning strategy to facilitate the process of knowledge construction by the students.



The role of students is to actively participate in the process of learning through asking questions, conveying their ideas and viewpoints. They are not supposed to sit at a desk all day & just attending the teachers' lectures rather they should actively engage themselves to learn on their own constructively, enjoy the learning and apply their natural curiosity to the world. They are required to collaborate & cooperate with their fellow peers.

6. ADVANTAGES OF THE 7E MODEL OF LEARNING

7E learning cycle model carries many advantages for both the teacher and the students. Some advantages outlined by the author are as follows-

Aid in deeper understanding of the concepts: 7E model advocates for active involvement of students' in the learning process rather than sitting back & passively receiving the information brought to them. As the students are engaging themselves with the content, making connections with their prior knowledge, exchanging, discussing, questioning, reflecting, applying their learning in new situations; it promotes deeper understanding of the concept and help them maintain their concentration throughout the learning process.

Makes the learning efficient: Learning is more effective if the teacher can determine what the students already knows about the concept being taught. This model has emphasized the necessity of eliciting previous understanding of the students. This step helps the teacher realize what the students need to know first, which in turn results in efficient and meaningful learning.

Promotes transfer of learning: 7E model prescribe transfer of learning or skills in the real-life situations. Research has shown that expert learners are much more adept at the transfer of learning than novices and that practice in the transfer of learning is required in good instruction (Bransford, Brown, and Cocking 2000).

Stimulates intrinsic motivation to learn: The 7E model favors providing conducive learning environment to the students. The favorable learning environment increases their motivation to learn. They find the learning interesting, engage themselves in the activities entirely from within rather than in order to receive some external rewards, work together and support each other, enjoy the learning process and find internal satisfaction in it.

Generates confidence and self-esteem: One of the important features of this model is that students are not judged based on 'right' and 'wrong' answers rather their point of view is given importance. Such an emphasis generates confidence and self-esteem in the

students making them ready to deal with more complex problems.

Develops thinking skills: In this technological era where information is accessible online, 24 hours a day, development of thinking skills have become more essential. This approach provides opportunities for insightful learning, teaches students to consider multiple aspects of a given situation or phenomenon, think critically about various possibilities and question the information before reaching any conclusion. This develops reflective thinking skills, critical thinking skills as well as reasoning skills among the learners which ultimately help them to make good decisions & quickly adapt to new challenges.

Develops communication and social skills: In 7E model students are expected and motivated to interact and communicate with peers and teacher in a healthy manner. They learn to work cooperatively, sharing their knowledge, viewpoints, findings with others. This help the students to improved social, mental and emotional well-being, build positive relationships with peers & teacher and thus making the learning more efficient.

Basis for developing instructional materials: 7E model serve as a basis for developing instructional materials specifically lesson plans & worksheets, which can be implemented by the teachers in their classrooms to facilitate teaching-learning process.

7. IMPLICATIONS & SUGGESTIONS

Several research studies indicated that the use of 7E model-based instructions in the classrooms helped the students in acquiring a better understanding of the concepts; increased students' achievement, helped in retention of the acquired knowledge; improved science process skills, critical thinking skills, analytical thinking skills, and attitude towards learning science as compared to conventional teaching (Adak,2017; Adesoji & Idika,2015; Gök,2014, Gürbüz et al.,2013; Mecit,2006; Naade et al.,2018; Şadoğlu & Akdeniz,2015; Siribunnam & Tayraukham,2009; Shaheen & Kayani,2015; Sharma,2018; Sornsakda et al.,2009; Wijayanti,2014). Miadi et.al. (2018) found out that the student's cognitive abilities also improved with the application of the 7E model. Turgut, Colak, & Salar (2017) observed that the students taught with the 7E model perceived the lessons more enjoyable. Balta & Sarac (2016) suggested that "Since the effect of 7E strategy in science teaching is so high, teachers should be encouraged to incorporate this strategy into their teaching, and to gradually customize it into their own personalized teaching style". Bozorgpouri (2016) also recommended that the seven stages teaching method generally in different sciences teaching can bring many benefits for students and their training.



The effectiveness of the 7E model has been supported by various research studies cited above. This model not only enhances students' achievement, retention, improves science process skills, critical thinking skills, analytical thinking skills, attitude, cognitive abilities, but also makes the learning enjoyable. Many research studies have also shown that the 7E model is much more effective as compared to the conventional methods of teaching. However, there are certain limitations in implementing this model. The Elicit stage plays a significant role in activating student's prior knowledge so they can build on it productively but in an average classroom it becomes impractical for a teacher to customize the curriculum according to the prior knowledge of every student within the prescribed time limit. Students also need sufficient time to finish the tasks, for participating in group discussions and to develop their understanding of the concepts. Practically it seems exceptionally difficult in our structured and crowded curriculum that demands completion of syllabus on time. Teachers often don't have the time to organize and plan the lessons based on this instructional approach. Creating an active, engaging environment for students also becomes troublesome and challenging if the teacher is not adequately trained in implementing constructivist methodology.

Based on the effectiveness derived from various research studies and advantages of the 7E learning cycle model, the researcher concluded that this model will prove to be very useful for in-service teachers, curriculum planners, prospective teachers as well as for the students. The researcher recommended that teachers should learn & embrace 7E model willingly in their teaching to make the process of instruction more effective, meaningful and enjoyable. The implementation of constructivist 7E model by teachers in their classrooms will also be beneficial for students to build a strong foundation of knowledge through active participation and their motivation to learn. For successful implementation of this method, pre-service & in-service teachers should be given training on a large scale. To save the time, teachers can also be provided with readymade lesson plan templates based on 7E model which they can modify according to the need of their students and the requirement of the content. Government & administrators should come forward to provide support and all required learning resources to the learners and the teachers. More ways need to be found out so that we can get the maximum benefits from this efficacious method of teaching & learning.

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