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A Synergistic Approach: Interplay of Teacher Guidance and Student Autonomy in Fostering HOT Skills through the 7E Model

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ABSTRACT

The current study aims to shed light on the significance of the 7E model for improving elementary school students' higher-order thinking abilities. It includes stages such as Elicit, Engage, Explain, Explore, Elaborate, Evaluate, and Extend. The 7E model has an impact on higher-order thinking (HOT) skills, such as problem-solving, brainstorming, analysis, evaluation, creation, critical thinking, and scientific reasoning. For students studying science, the 7E Model lesson has proven as an effective aid in enhancing HOT skills among students. The strategies suggested under the constructivist approach include,among others, brainstorming, KWL charts, Think-Pair-Share, concept maps, mind maps, and puzzles, which enable students to construct knowledge independently using their creative thinking and experiences related to prior knowledge.

Keywords: *7E Model and Higher Order Thinking Skills*

Introduction: Education is one of the most effective ways to tackle the new challenges of the century, and it is the honorable responsibility of educators to maximize each student's intellectual and creative potential while equipping them to address today's issues (Sharma, Meenu, & Ankit, Dr. 2023). The quality of instruction provided in the classroom has a significant impact on raising the standard of education. Improving the quality of education is necessary to support people's holistic development. According to the state of education today, learning is not a standalone activity but rather is linked to children's beliefs and surroundings. It highlights that the primary sources of learning are a learner's ideas, viewpoints, thoughts, and experiences. Therefore, to create new information for the learner, prior experience and existing knowledge are crucial. These concepts present a novel method known as "Constructive Learning" or "Constructive Perspective."

Objective: To enhance the higher-order thinking skills among elementary stage students by using the '7E' model.

CONCEPT OF CONSTRUCTIVISM: Constructivism is a novel philosophy of learning that has an impact on educational systems all around the world. It supports learner-centred education and rejects the conventional teacher-centred classroom. This method involves kids in the process of creating information and keeps them actively participating in the classroom (NCERT 2008). Essentially, constructivism is a theory of learning that holds that information is created by the learner via mental effort. Students actively participate in the search for meaning. The notion is predicated on the idea that thinking back on past events enables us to intentionally create our worldview. Every person develops their own "mental models" and "rules" for interpreting experiences. Therefore, learning is only the process of adding new knowledge to such models (Von Glaserfeld 1984). According to Naylor and Keogh (1993), Constructivism is an approach embedded with the central theme that students can make sense of a novel situation based on their prior understanding. Constructivism is the theory that holds that students must expand their comprehension of novel concepts. Many academics and experts in learning theory and cognition, such as Howard Gardner, George Hein, Eleanor Duckworth, and Jean Piaget, have studied these concepts in detail. The Biological Science Curriculum Study (BSCS), directed by Principal Investigator Roger Bybee, developed an instructional constructivist paradigm known as the "Five Es." Learning is described using the five stages of this model: engage, explore, explain, elaborate, and assess.

7E model: In the seven planned and connected phases of the 7E learning cycle model, the student explores teaching materials, conducts various scientific investigations, develops a concept after reaching a particular conclusion, and then applies the concept or a principle in a new situation (Eisenkraft, A., 2003). The following is a description of each of the 7E model's phases: Elicit, Engage, Explore, Explain, Elaborate, Evaluate, and Extend.,
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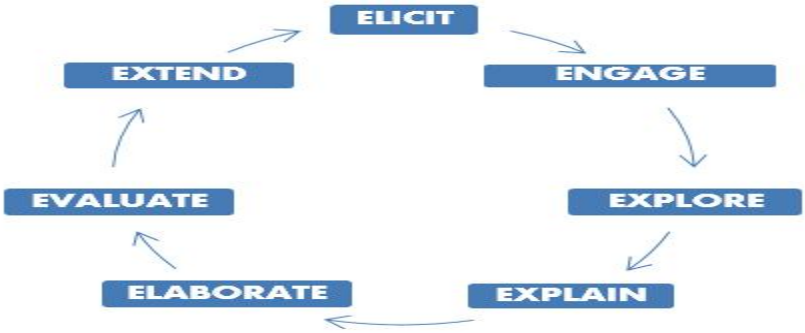

Elicit Phase ; This phase's main objective is to provide students with an opportunity to share their intuitive knowledge because they are not empty canisters that need to be filled; rather, their prior knowledge serves as a strong foundation for learning new material. Evoking prior knowledge or understanding is a crucial component of the teaching and learning process because it creates a strong basis for later phases, according to contemporary cognitive science studies. During this stage, the student's past knowledge is triggered. Reviving the learners' prior knowledge is essential since starting too quickly from the engagement phase may be viewed as inadequate in fostering their critical thinking skills. Under distinct sections, the roles of the instructor and the pupil at each stage are explained.

The Teacher's Role: During the elicitation phase, the teacher actively participates. By presenting the main idea, the instructor can give students external stimuli through concept cartoons, unfinished mind maps, or concept maps. The kids can also be shown KWL (Know, Want, Learn) charts. As a reminder of its significance in productive learning, the elicitation phase ought to stand alone.

The Students Role: During the elicitation phase, students exhibit active participation. Students attempt to make connections between the presented concept and their prior knowledge, as the main notion of the topic is presented to them. Students are provided with ample scope to display their own talents and ideas during this phase.

1. **Engage Phase:** The elicit and engage phases are not switched in the 5 E model expansion. The engagement phase remains an essential element. The teacher uses the elicitation phase to get the students involved, based on their level of understanding. The teacher then crafts and designs the required material to carry out an effective teaching and learning process.

   Role of the Teacher: The teacher tries to pique the pupils' curiosity and enthusiasm for the idea, such as by demonstrating simple activities. The teacher identifiesstudents' prior misconceptions throughout this step.

   Students' role : The engagement phase involves brainstorming by the students. To communicate their thoughts to their peer groups, they employ the think-pair-share process. Students have a lot of enquiries throughout an engaging phase. "What do I already know about this?" is one of the questions they ask themselves. Why did this occur? And from this, what can I infer?
2. **Explore Phase:** Students are given multiple chances and opportunities to think freely throughout this period, as long as they stay within the parameters of the activities. Although the teacher addresses and assists the students in developing a new notion at this phase, the students'involvement is crucial, and the teacher takes a passive role, acting as a facilitator and guide.

   The Teacher's Role: The teacher motivates the students to collaborate and work cooperatively with one another. The teacher asksthought-provoking questions to redirect the learner's curiosity. The instructor gives students enough time to work through the assigned difficulty. To put it briefly, during the exploration phase, the teacher serves as a guide to the students and establishes a need-to-know environment for students.

   The students' role: The students put their forecasts to the test. Based on the evidence gathered, they formulate specific hypotheses, gather and analyse data, and then compile their results. Studentsshare their findings with their peer groups during this phase, which places a high value on peer interaction.
3. **Explain Phase:** Students communicate their conceptual knowledgethat they gained during the exploration phase verbally at this phase. During this stage, both the instructor and the pupil actively participate in the discussion.

   The teacher's role: The instructor urges students to communicate and describe their ideas. The teacher asksstudents to explain and provide evidence. The definitions or scientific terms are subsequently and properly introduced by the teacher to the entire class. The teacher then evaluates students' understanding.

   The students'role: Students attempt to understand their explanations throughout this phase. They discuss potential fixes or substitutes. Students pay close attention to what their peer group has to say. Students are also able to challenge other students' explanations. Students are given opportunities to evaluate their learning**.**
4. **Elaborate Phase:** This stage aids in expanding the conceptual knowledge of the learner. By engaging in similar activities, students have a deeper understanding of the topics. During this phase, students'practical abilities are improvedand honed.

The teacher's role: The teacher assists the pupils in coming up with several ways to explain the idea. The students will have more chances to develop and hone their practical abilities. The student can be shown similar exercises to gain a deeper comprehension of the idea.

The students' role: Students ask more questions, make decisions, offer answers, and more by drawing on their prior knowledge. They will typically use the evidence to reach logical conclusions.

5. **Evaluate Phase:** Students are encouraged to evaluate their knowledge and skills during this period. Through formative and summative assessments, it gives the teacher a chance to gauge the pupils' development. While the teacher moderates the segment, students are free to ask one another questions to assess their comprehension of the idea and to learn from one another's answers.

The teacher's role: The teacher will use both formative and summative evaluations to gauge the students' comprehension of the idea throughout this period. It will be possible to observe how the pupils' thinking skills have changed. To help students finish the material they have learnt, the instructor may use open-ended questions, a mind map, concept cartoons, or a KWL chart. According to some reviewed research, expert learners are far more flexible when it comes to the practice of learning transfer, which is necessary for effective instruction (Bransford and Cocking, 2000). This phase was added to let teachers know that using typical assessment methods is not the end of the process. The addition's explicit goal was to remind science instructors of the importance of using learning transferability.

Role of the Teacher: Science teachers must ensure that once a skill or concept is learnt, it must be used in a novel or unfamiliar situation. Science teachers must make sure that students' comprehension of concepts extends beyond elaboration and assessment.

The students' role: Students will practise learning transfer during this period. They frequently use a technique or idea they have learnt in the classroom in novel contexts. Students will be able to remember the material longer if they are exposed to it in a different setting.

Table1: The list ofactivities under each stage of the 7E model of teaching

Stagesof7E Learning InstructionalModel	Activities in the classroom
1. ElicitPhase	• Offers the pupils a chance to share what they already know. • To extract prior knowledge, one can utilise concept cartoons, concept maps, mind mapping, and KWL (Know Want Learn) charts.
2. EngagePhase	• Createsinterest by engaging students in activities. • Generatescuriosity by showing videos aboutthe topic to be taught. • Raisesquestions. • Demonstratingshort activities.
3. Explore Phase	• Promotes teamwork among the pupils without the teacher giving them explicit instructions. • Pays attention to how the kids engage with one another. • When needed, asks insightful questions to refocus the students' research. • Gives students enough time to work through challenges. • Graph interpretation, experiments, and simulations. • The instructor facilitates learning for the pupil. • Establishes a "need to know" environment.
4. Explain Phase	• Encourages pupils to define terms and explain ideas in their own words. • Asks students for explanations and supporting documentation. • Clearly defines terms, provides explanations, and adds additional labels as necessary. • Explains concepts using students' prior experiences as a foundation. Evaluates pupils' increasing comprehension

5. **Elaborate Phase**	• Demands that pupils make use of the formal labels, definitions, and justifications that have already been given. Bring up other possible explanations with the kids. • Refers students to existing data and evidence and asks, “What do you alreadyknow?” Why do you think?”
6. Explain Phase	• Encourages pupils to use their own words to define terms and explain topics. • Requests explanations and supporting documentation from pupils. • When necessary, formally specifies definitions, justifications, and new labels. • Explains ideas based on the prior experiences of the students. • Evaluates pupils' developing comprehension.
7. Elaborate Phase	• Demands that pupils make use of the formal labels, definitions, and justifications that have already been given. • Brings up other possible explanations with the kids. • Points students to available information and proof and enquires, "What do you already understand? "What do you believe?"

Discussion: Considering the nature of the current curriculum, constructivism will be extremely significant and vital. Even if kids are at the core of the educational system, educators believe that teachers play an equally significant part in this situation. The 7E approach guarantees educational activities and learning experiences that align with a child's schema. It emphasises that the child's experiences and activities must support that fundamental mental model. It is necessary to determine the child's pre-existing schema, or previous knowledge, before including them in any knowledge production process. Additionally, it enables the teacher-student relationship to develop disequilibrium in the child's mental growth.

The youngster becomes curious because of this process, and it also inspires them to learn more and grow mentally. The teacher should set up a comfortable space where the child may interact with the material or learning instrument, as well as the physical and social surroundings. In this regard, its goal is to give pupils a learning experience or context. Students should be involved in the assimilation process for the educational setting to be effective. At this point, the youngster integrates new ideas and information with what they already know.

It also aids in the expansion and extension of the mental modalities. Additionally, the teacher encourages the student to apply past knowledge, make connections with current knowledge, and proceed in an orderly manner. The child should finally build the mental model and be regarded as though they are real. It is an equilibrium stage. Applying constructivism to the teaching and learning process becomes essential after considering these consequences for the classroom. It can have a significant impact on a child's overall growth.

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