CONSTRUCTIVIST 7E TEACHING AND LEARNING MODEL OF ALGEBRA IN SECONDARY SCHOOL LEVEL - A THEMATIC APPROACH

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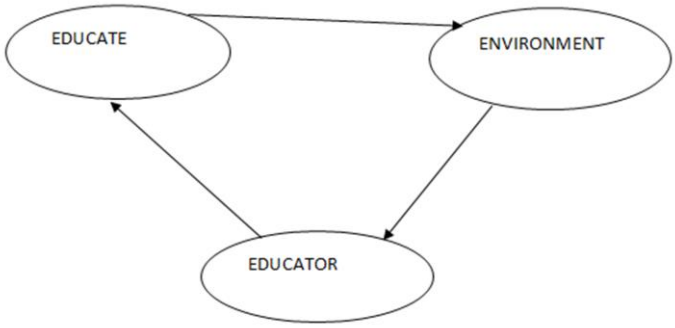
Abstract
Research takes a vital role in the present scenario of the educational system. The progress and prosperity of a nation depend upon our educational system. Educational technology changes according to the advancement of teaching-learning prospects. So researcher conducted a research work entitle – Effect of Constructivist 7E Model of teaching Algebra on Mental ability, Mathematical Interest and academic achievement of Students at Secondary level. In this study, the researcher adopted Experimental methods. Take 312 students in class IX as a sample and 4 Secondary schools of Bargarh district Odisha. From the algebra selected for the experimentation. The Chapters were "set-operation and application of set "and "Real Number" of Odisha State syllabus. These concepts to be developed, the principles to be formulated, the procedure adopted for developing rules, equations, and diagrams, and the processes leading to problem-solving were carefully identified. The sample lesson transcripts based on 7E Model was prepared by the investigator and standardized with considering experts opinion. Then five-lesson transcripts were given for try out to students in a division of Standard IX. After the tryout, the lesson transcripts are modified and restructured based on the actual feedback.
Key Words: 7E Teaching model, Mathematics and Constructivists.

Introduction

Without education, an individual does not count a human being. Teaching takes a vital role in every individual. Education each one of the portent instruments; copes with the greatest challenge of the 21st century. Education is the teacher noble's mission to reveal every learner's intellectual and creative potential as per as possible. Educators achieve the educational objectives in the classroom teaching-learning process. The 7E teaching model is more significant.Teaching-learning process based upon 3 'E.,' i.e., Edu cant, Educator and Environment; The figure is given below-



In 7E teaching, the Model is an instruction between the education and environment. Learning/Teaching is an interaction between learner and learning experiences. Learning without meaningful understanding is valueless in our life. So why a teacher should use a productive teaching method to make meaningful learning.

So the researcher selects the constructivist 7e teaching model to be more practical, applicable, and appreciate the learning method to where learners forecast their inter potentiality, construct new knowledge, and discover new ideas and ideologies.

Significance

Every educational institution runs to throw a specific curriculum. Up to class 10 learners follow the same curriculum structure at the state level. The curriculum consists of different subjects and mathematics, each one of the critical issues in our life. Shut out mathematics from daily life, and civilization comes to a standstill. Nobody can live without mathematics for a single day. Mathematics is intimately involved in every moment of everyone's life.

Everybody needs some knowledge of mathematics in one way or the other. It is believed that mathematics is a complicated subject. Therefore, with the study of this though subject, everybody cannot learn it successfully. So, in this case, the teaching-learning process takes a vital role in encouraging mathematics teaching. To eradicate this issue, the teacher

follows the 7E Model of teaching in his/her classroom situation and got excellent educational objectives achiever in his/her teaching-learning process.

Algebra is a part of teaching mathematics. The teaching of algebra envisaged that is the language of teaching mathematics. The researcher worked as a mathematics teacher in secondary school for five years and assessed students' mathematics performance and potential. And also, researchers diagnosis the problem and failure of students in learning mathematics. After a lengthy discussion, the researcher planned to develop a constructivist teaching model about mathematics called the "7E teaching model of Algebra and overview".

Constructivist 7E teaching model

Constructive teaching and learning predicated on the belief that learning occurs when learners are actively involved in understanding and knowledge construction against passively received information.

C=constructs knowledge by the learner himself.
O=Offer Learner-centered learning.
N=Notified concrete understanding.
S = Satisfy appropriate Learning outcome.
T = Thinking power develops within the learner.
R = Reflect on learner intellectual competencies and skills.
U = Using the idea of "Learning without Burden" and capable learners of utilizing learned knowledge.
C=Complete comprehensive evaluation.
T=Teacher is a facilitator of the teaching-learning process.
I = Innovative ideas increased within the learner.
V=various learning skills like observation, demonstration, etc., developed.
E = Enhance social skills and collaborative learning.

7E teaching model consists of 7 phases, namely 1. Elicit, 2. Engage; 3. Explore, 4. Explain, 5. Elaborate,6. Extend, 7. Evaluate. This teaching model helps the learners construct their knowledge, understand, analyze, synthesize, apply, create, etc., from their experiences and ideas

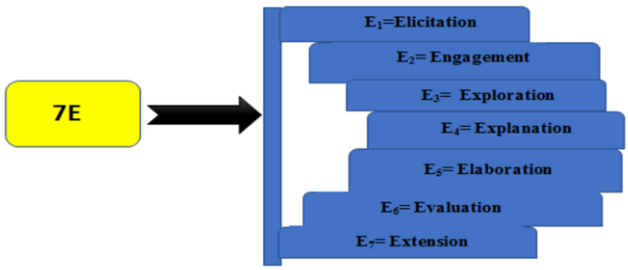
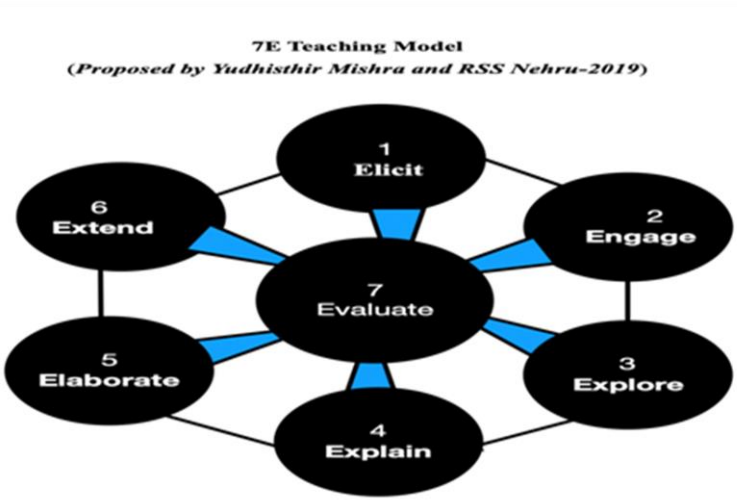


Figure of 7E Teaching Model



Description of 7E Teaching Model

ELICIT

It is the 1st phase of the 7E teaching model. It comes from the Latin word 'Elicio' it means 'draw out' or 'called forth.' Elicit means evoke or draw out prior knowledge from learners. In this phase, teachers try to capture the learner's attention on the subject matter. A teacher also examines learners' previous knowledge of the subject matter. Elicit (Educe) to bring out to draw out something hidden, latent, or reserved. Elicit usually implies some skill in drawing forth a response. Elicit is a teaching technique. The teacher used to get learners thinking and saying what they know about a subject. It used to ask learners to come up with vocabulary and language and language form and rules. To brainstorm a topic at the start of a skill lesson.

ENGAGE

It is the 1st phase of the 7E teaching model. It comes from the French verb engager. Engager means to occupy the attention or efforts. To execute the learner's interest. The strategy of Engage phase

- Get learners interested
- Discuss current events
- Allow your learners to take ownership of their learning.
- Learners assume various roles in the classroom.
- Sufficient use of technology
- Have a little entertainment, enjoyment.
- Educator engagement = Educant engagement.

Peak student's interest and personal involvement in the lesson is the primary purpose of the engaging phase. Used a smartboard, video, asking questions, reading an excellent book, acting, storytelling, and introducing the game to engage the students and start a lesson.

EXPLORE

It is the 3rd phase of the 7E teaching model. It comes from the root word **explorer** means to search out or to investigate. Explore means to investigate, to study, or to analyze. It deals with leading to knowledge and understanding. Learners are deeply involved in the topic, and preceding them to build their knowledge power is called the exploring phase's primary purpose. In this phase, learners directly applied the materials and developed his/her knowledge of management about the topic. They sharing communicating their everyday experiences in his/her peer's group. In this phase, learners identify their own mistakes and delete it. By exploration, learners discover the answer to possible questions—educator role as an organizer, guider, and providing materials.

EXPLAIN

It is the 4th phase of the 7E teaching model. Explains comes from the Latin word explain. Explain means spread out or make explicit or make apparent. In this phase, learners teach the concept. Students and teachers include the interaction of the topic. Learners have difficulty learning new thinking ways without the help of their educator. In this phase, the educator helps students erase the problem and find modern thinking. So this phase is considered as a most teacher-centered phase. In this phase, teachers use other exciting methods to define their work or explain the topic.

ELABORATE

It is the 5th phase of the 7E teaching model. Elaborate comes from the Latin word Elabratus. It means "to work out in very details." Another means "to build up from simple elements." In this phase, learners apply the gaining knowledge in a simple form. They learn new concepts and keep in his or her minds. Learners to use formal terms, definitions, and also exhibit their comprehension. It helps the learners to extends their conceptual understanding in this phase. Learner's to think of an alternative explanation of the concept with the help of the educator. Learners will tend to draw a reasonable conclusion from the evidence.

EXTEND

It is the 6th phase of the 7E teaching model. It is called a post-evaluation step. It involves transferring newly acquired skills and knowledge to new situations within the content. Extend stage is an essential technique of teaching. It is active around the aims of a class, but it often as homework. This offers more ways of practise. Learners will also make learning in the classroom more interesting as they give learners a chance to read about extreme sports in this stage to personalise language and content. Choose one to further explore. Extending means extending out or spreading out from the Latin term. In a new context, learners deepen conceptual understanding by usage.

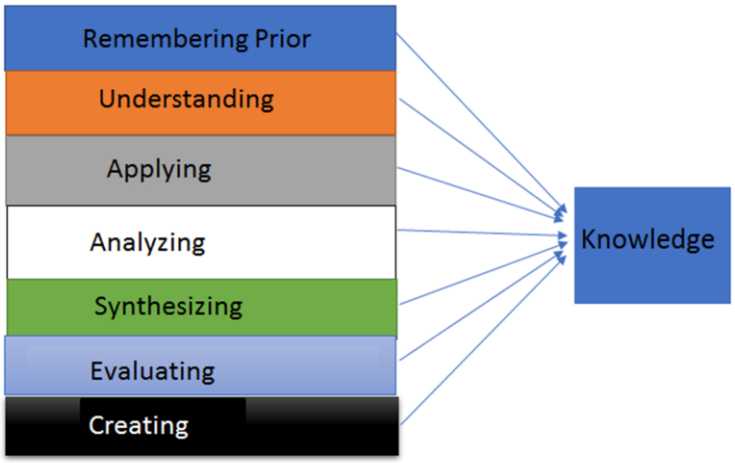
EVALUATE

The 7th phase of 7E teaching model; The root word of evaluating is value. Value means "worth." Evaluation is an examination to find the worth of something. The main motto of this phase is How the teacher will know the learners have learned the topic. In this phase, the teacher asses, the learners, and the teacher measured their educational objectives-how he\she achieved the objectives. What have the learners learned? By using the assessment sheet teacher quickly asses and what need to be re-teach. The teacher observed the change in learner thinking skills. The teacher may ask open-ended questions to

complete the information they have learned during the teaching-learning process. Learners also answer open-ended questions asked by the teacher, and they may ask to interpret data.

Basic Elements

Seven essential elements guide 7E teaching models—that in the figure given below.



Differences of Traditional Teaching Method & 7e Teaching Model

Traditional Teaching Method	7E Teaching Model
1. The programmer is presented part by part, with an emphasis on the skills required.	1. With a focus on large topics, the programmer is presented entirely in part.
2. It is highly respected to strictly follow the set curriculum.	2. It is highly valued to look for students' concerns.
3. Textbooks and workbooks rely heavily on curricular activities.	3. Main and manipulative sources include objects.
4. Students are views onto which the teacher etches data as 'blank slates.'	4. With emerging ideas about the universe, students are regarded as thinkers.
5. Typically, teachers behave in a didactic way, disseminating knowledge to students.	5. In general, teachers behave interactively, mediating for learners in the community.
6. To validate student learning, teachers seek the correct response.	6. Teachers seek the points of view of the students in order to clarify the current conceptions of students for use in subsequent lessons.
7. Evaluation of the learning of students is seen as distinct from teaching and happens almost exclusively by assessment.	7. Student learning assessment is interwoven with teaching and takes place through teacher assessments of workplace learners and exhibits and portfolios of students.
8. Students primarily work alone.	8. Students primarily work in groups.
9. Introduction, Presentation, and Evaluation are this 3-phase method.	9. This 3-phase process is introduction, presentation, and evaluation.

Why the researcher adopted the 7E teaching model?

The researcher adopted the 7E teaching model in mathematics (algebra), and as a result, he got the tremendous success that it is a beneficial, student-centered, comfortable, and appropriate teaching model. Learners developed their

cognitive, affective, and psychomotor domains. As per the concrete evaluation, the researcher adopts the Model, which is discuss given below.

- It takes into consideration the need of the learner, his age, intellectual, previous knowledge interest.
- It gives a concrete understanding.
- Learning is permanent and retains for a more extended period.
- The classroom remains active and lineally.
- Students maintain social discipline.
- It supports the idea of "Learning without burden."
- It develops reflective thinking and critical thinking, along with divergent thinking.'
- It inculcates the intellectual power and innovative power of the child.
- It involves co-operative or collaborative learning.
- It will improve social skills also.
- It develops the intellectual competencies of the learner.
- Various learning skills, such as observation, interpretation, demonstration skills developed.
- It makes learning joyful, and individual development occurs along with group achievement.
- It gives slopes for multiple protectiveness and application of learning.
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Educational Implications (Based on Investigator's Investigation

The 7E teaching Model is an effective way to help students enjoy mathematically, understand mathematical content, apply the mathematical formula and mathematical concepts to authentic situations. By cultivating student's interest in mathematics and developing reasoning skills, this Model promotes a more in-depth understanding of the nature of mathematics and problem-solving.

The study reveals that the 7E teaching Model is more effective in enhancing Mental Ability, Creativity, mathematical Interest, achievement in mathematics (in general), and algebra (in specific) than the Traditional Method. The following are the significant implications drawn from the study.

1. Information on the 7E teaching model provides a useful framework for understanding learners and identifying gaps in the teaching methods. Preferably, label students, teachers can use this knowledge to determine whether their approach to subject matter offers choice and variety.
2. In the elicit and engage phase of the 7E teaching Model; So the teacher can teach the students based on this assessment while teaching mathematics.
3. The 7E teaching Model must strive to engage students in an authentic learning experience that initiates students' mathematical thinking and acts on mathematics.
4. Elicit and Engage phase, students provided with disequilibrium with their existing conceptions so that they will have to rethink and retry to reconstruct their knowledge.
5. 7E teaching Model is a constructivist approach, and it gives importance to the process rather than the product, especially in the Explore and Extends phases of the Model. Thus on the constructivist perspective.
6. The concept of self-refinement or self-correction is the most progressive idea in editing the portfolio of students. The Evaluation phase of the 7E Model provides the best option for assessment and correction.
7. The 7E emphasizes the constructivist concept of peer-peer interaction and greater classroom community in learning.
8. As a constructivist model, 7E emphasises the prior experience of learners rather than teachers and the active building of knowledge rather than the passive reception of information.
9. In the current model, the learning environment focuses directly on learners. Education focuses on thinking and understanding the significance of context, genuine problems and tasks, learning discovery, prior knowledge of students, group projects and discussions, student choice and accurate evaluation.
10. Students learn how to articulate their ideas clearly and successfully in a constructivist classroom like the 7E teaching model, sharing in group discussions. Students therefore exchange ideas and negotiate with others and evaluate their input in a socially acceptable way.
11. This teaching-learning strategy gives the teachers enough freedom to choose appropriate and authentic activities and materials of varying forms, which helps in planning the classroom activities according to the students' needs and interests. This innovative planning will improve the creative level of teachers and students.

Benefit of Learners

7E The teaching model helps students positively develop their knowledge. It gives ample space for active engagement and social contact with peers and teachers in the classroom. Students of all intelligent levels will gain a better chance of acquiring new knowledge through interaction, especially for low-smart students. Analysis, divergent thought, perception, capacity, critical thinking, and scientific attitudes to science education can be established.

Benefit of Teachers

The teacher can gain greatly from recognising the teaching model of 7E, which deals with the results of the current research. As such, teachers need to promote peer participation, group discussion, creativity, field trips, etc. 7E The teaching

model between teacher and student will provide such a situation. By promoting the learning process as a two-way learning model between learners and teachers, this model facilitates joyful learning among students in classroom situations. The values of the teacup.

Benefit of School administration

The school setting plays a key role in guiding the process of teaching and learning. In developing a pleasant environment between teachers and learners, the administration of the school has a vital role. The teaching model 7E can establish such a situation that the principles can be interpreted in several ways by a learner. Teachers always attempt to provide the appropriate situation for learning. The teaching model 7E provides students with greater academic achievement. The school admi admi, in order to effectively execute this strategy

Limitation

- It requires a high level of teacher competencies.
- It is time-consuming; although it gives factual knowledge, it makes time as individuals need one concerned.
- In some cases applying constructivism is not possible (Abstract things).
- It requires resources which may not be affordable.

Conclusion

The 7E teaching model is an effective teaching and instructional method to teach in Indian classrooms instead of applying traditional teaching mathematics. This Model gives a new insight into the play by examining it analytically and critically. Students' participation increased as they are involved in various activities. The construction of worthy ideas takes place in the learners as they gradually understand the drama. An educator's role uplifted as a guide & a facilitator who positively reinforces the learners to construct and knit worthy ideas altogether. It is ultimately a learner-centered approach, where learners are provided with a handful of experiences and events. The educators' teaching style is also improved because they can deal with the heterogeneous and diverse classrooms, where each student's differences into account. With other dramas as well; Hence, with the educator's clear structuring, this pedagogical approach can be very beneficial for the students in strengthening their critical, reflective, and analytical skills.

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