



A STUDY OF EFFECTIVENESS OF 5E INSTRUCTIONAL MODEL ON ACHIEVEMENT IN PHYSICAL SCIENCE OF SECONDARY SCHOOL STUDENTS.

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ABSTRACT

The 5E instructional model is a framework for teaching science that includes five stages: Engage, Explore, Explain, Elaborate, and Evaluate. It's designed to facilitate inquiry-based learning, allowing students to actively participate in the learning process through exploration and discovery. Each stage serves a specific purpose in helping students build understanding and retain knowledge. These five phases guide a teacher to plan, organise and implement the teaching- learning activities in an effective manner in the classroom. This model has gained immense acceptance in the field of school education in order to enhance the teaching-learning experiences and boost the academic achievement of the students in various subjects. Science is a compulsory subject at Elementary level schools in Odisha. Teachers can tailor the activities and materials in each stage to meet the diverse needs of their students, whether through modifications, extensions, or differentiation strategies. This inclusivity ensures that all students have opportunities to participate meaningfully and achieve success in their learning. In this method the researcher used quantitative experimental method. The result shows using 5E Instructional Model has enhanced the achievement, engagement and retention of the secondary school students.

KEYWORDS: 5E Model, Constructivist Approach, Achievement Test, Pre- Test, Post- Test, Quantitative Experimental Research, Experimental Group and Control Group.

INTRODUCTION

The goal of education is to empower individuals with knowledge, critical thinking skills, and values necessary to lead fulfilling lives, contribute to society, and adapt to an ever-changing world. Now a day, teaching physical science at school level is much more complex than ever before because of its diverse and dynamic nature. Thus, there is a need to shift from the conventional methods of teaching Physical science and adopt more effective and advanced models.

The 5E model of teaching is based on the Constructivist Learning Theory. This model was developed by Roger Bybee (1990) of Biological Science Curriculum Study (BSCS). In 5E Model of Teaching the students construct their own knowledge by themselves from their own experiences. Teacher acts as a Facilitator. Every element of the five "Es" is carefully crafted to promote the construction of knowledge by the students. The 5Es are as follows:

Engagement-This step captures students' interest and stimulates their curiosity about the topic through activities, demonstrations, or questions. It sets the stage for learning by connecting prior knowledge to the new concepts. **Exploration-** In this phase, students actively explore the concept through hands-on activities, experiments, or simulations. They make observations, ask questions, and gather data to develop their understanding of the topic. **Explanation-**In this step, students are guided to articulate their understanding of the concept through discussion, reflection, and clarification. Teachers provide explanations, introduce new vocabulary, and address misconceptions to help students construct meaning. **Elaboration-** Students apply their

understanding of the concept to new situations or contexts. They engage in further exploration, extension activities, or real-world applications to deepen their understanding and make connections to the broader world. **Evaluation-** In this final phase, students demonstrate their understanding of the concept through various assessment methods, such as quizzes, projects, or discussions.

OBJECTIVES

- To study the effectiveness of 5E instructional model on achievement in physical science.
- To evaluate the effect of the 5E Instructional Model on student engagement and retention in physical science.

METHODOLOGY

To study the effectiveness of the 5E Instructional Model in physical science education, a quasi-experimental design has employed, involving 60 secondary school students selected by using purposive sampling, divided into an experimental group (5E Model) and a control group (traditional methods). Both groups has undergone pre-testing to assess baseline knowledge, followed by an 2 weeks instructional period where the experimental group experiences the 5E phases (Engage, Explore, Explain, Elaborate, Evaluate), while the control group receives conventional teaching. Post-testing has measured immediate learning gains, and a follow-up test after 1 week has been assessed knowledge retention. Data has been analysed using statistical methods to compare group performances, supplemented by surveys on student engagement . Ethical considerations, including informed consent and data confidentiality, has been strictly maintained.

Analysis and Interpretation

Analysing the effectiveness of the 5E model on secondary school students' achievement, engagement, and retention in physical science reveals significant positive outcomes. Pre-test and post-test scores demonstrate increased achievement, indicating the model's efficacy in facilitating learning. Higher engagement levels observed throughout each phase of the 5E model suggest greater student involvement and enthusiasm for learning, contributing to improved outcomes. Additionally, sustained retention of knowledge over time highlights the model's ability to foster deep understanding and long-term learning. These findings underscore the 5E model's effectiveness in enhancing student achievement, engagement, and retention in the context of secondary school physical science education.

CONCLUSION

The results of this study show that the 5E model of teaching physical science can assist the teachers to provide effective teaching- learning experiences to the students and enhance their academic achievements in the particular subject. 5E model of teaching is an activity- based Constructivist approach of teaching that promotes the active participation of the students in the teaching- learning process and provide them the opportunity to construct their own knowledge on the basis of their own experiences. However, the teacher needs to be competent enough with pedagogical skills and expertise to effectively implement this model of teaching physical science in the classroom.

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