E-ISSN No : 2581-6195 | Volume : 7 | Issue : 3 | March 2024

PEN MODEL OF TEACHING LEARNING: NEEDS AND SIGNIFICANCE IN PHYSICAL SCIENCE

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ABSTRACT

The present study was an attempt to developg learning in physical science of secondary schools under CBSE board. The goal of education is not to increase the amount of knowledge, but to create the possibilities of a child to invent and discover and to prepare the pupil to face challenges and keep pace with the advancements of science. Indeed, the task of teaching science at the school level is now more complex than ever before since its excitement and diverse possibilities must now be infused into the young minds in an appropriate, dynamically evolving way. The PEN model consists of 3 phases (project base learning, experimental learning and experiential learning). Each phase is consisting of 3 steps and the 9 steps are educe, entice, examine, engage, explore, explain, elaborate, evaluate and extend. It is a pure or fundamental research. The population of this study was the whole NEP 2020 report and all the textbooks of secondary schools under CBSE board. The sample consists of the science textbook of class IX and its first chapter named as matters in our surrounding, the page no 4,5,8,12 of NEP 2020 report. The research uses the format of smart lesson plan and NCERT science textbook as tool to conduct the study. The qualitative data collection was done for this study. This demands that the entire game of teaching science has to change from its conventionality. Moreover, in the world of today where knowledge is being multiplied exponentially, Science education will not be able to justify itself by remaining merely contented with the objective of imparting a certain quantum of scientific knowledge, however large be the quantum. Since the rate at which knowledge gets obsolete is very high and therefore it is essential that the emphasis of science education should be on the development of abilities and disposition of mind rather than merely the transfer of dead subject matter.

KEYWORDS: Pen Model, Secondary School,Teaching Blearning Process

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HOW TO CITE THIS ARTICLE:
Dipti Ranjan Rout (2024). Pen Model Of Teaching Learning: Needs And Significance In Physical Science, International Educational Journal of Science and Engineering (IEJSE), Vol: 7, Issue: 3, 35-38

INTRODUCTION

Hence the teaching learning process changes from gurukul to google system, so we have to enhance our method of teaching where the student play the active role according to the demand of current era. As the New Education Policy (NEP) rolled out in 2020, there has been a phenomenal effect on the teaching-learning approach to date. Education in India has been in a continuous process of evolution to keep up with the changing times. By introducing PEN model in physical science, for innovative learning experiences by emphasizing on nurturing learners with better information retention and conceptual understanding and create educe, entice, examine, engage, explore, explain, elaborate, evaluate and extension.

Education gives "PEN" to an individual. NEP 2020 emphasized three types of learning i.e., Project based learning, experimental learning and nurture experiential learning.

It means learning takes place through project, experiment and experience because child have got the joyful learning. They explore their inner potential in a joyful and generous way. They construct their own knowledge in different way. PEN model is a constructivist teaching learning model. This process follows three phases. First phase is project learning, experimental learning and nurture experiential learning.

This model represents child centered learning where the role of teacher is both active and passive. This model develops cognitive power of the child. This enhances the exploration ability of the learner. It creates collaboration among their peers, friend and teacher to work together. It develops leadership capacities of the child. Learner explains the concept by themselves.

Project-based learning (PBL) is an instructional approach designed to give students the opportunity to develop knowledge and skills through engaging projects set around challenges and problems they may face in the real world. It is more than just "doing a project," in the way that students investigate and respond to an authentic, engaging, and complex problem or challenge

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with deep and sustained attention. PBL is "learning by doing."

It is the 1st phase of the model which is denoted as P. In this phase teacher target to inculcate inner potentialities of child which related to the present the current topic. What they are going to present assigned homework through project. This phase has three domains e.g., educe, entice, examine.

It is 2nd phase of the model which is denoted as E. E stands for experimental learning. In this phase teacher present the lesson experimentally. This phase consists of three domains e.g., engage, explore, explain. In engage, the students participate into the specific work what they have going to know. After that student explore what they going to do? At least one experiment is done by the teacher. After that students going to perfume the experiment one by one and then they are capable to explain about the basic concept clearly.

Nurture Experiential learning (ExL) is the process of learning through experience, and is more narrowly defined as "learning through reflection on doing. Experiential learning is distinct from rote or didactic learning, in which the learner plays a comparatively passive role. Experiential are nurtured for students and instructors to explore and examine their own values. The instructor's primary roles include setting suitable experiences, posing problems, setting boundaries, supporting students, insuring physical and emotional safety, and facilitating the learning process.

It is 3rd phase of the model which is denoted as N. N stands for Nurture experiential learning. In this phase the students construct their knowledge by their own experience. This phase consists of three domains e.g., elaborate, evaluate, extension.

Secondary school is the intermediate between elementary school and college level. This is preparatory stage for student for college or higher education. In the secondary school of physical science is one of the most important subjects for higher education, career as well as for life.

OBJECTIVE OF THE STUDY

1. To Investigate the application of the PEN model to improve student engagement and understanding in physical science studies.
2. To Assess the effectiveness of participatory and experiential learning methods in enhancing critical thinking skills within the context of physical science education.

METHODOLOGY

The methodology for achieving the objectives involves conducting a literature review to understand the application of the PEN model in science education, particularly in physical science, followed by aligning the curriculum and developing teaching materials accordingly. Educators will be trained in PEN model strategies before implementing them in physical science classes, emphasizing participatory activities and hands-on experiments. Data on student engagement, comprehension, and critical thinking skills will be collected through observations and assessments, then analyzed to evaluate the model's effectiveness. Feedback from students and educators will inform iterative refinements to the implementation approach, leading to the documentation and dissemination of findings to share insights with the broader education community..

ANALYSIS AND INTERPRETATION

Analyzing the development of a PEN model for teaching and learning physical science in secondary schools involves a multifaceted approach. Pedagogically, it necessitates aligning curriculum standards with innovative instructional strategies tailored to diverse learning needs, while integrating effective assessment practices. Regarding the environment, attention must be given to creating a conducive physical space equipped with modern technology and robust safety measures. Cultivating a nurturing atmosphere involves continuous teacher professional development, fostering student engagement through real-world applications, and forging strong community partnerships. This holistic analysis underscores the significance of pedagogy, environment, and nurture in fostering a dynamic and effective educational experience in physical science for secondary students.

EDUCATIONAL IMPLICATION

The PEN Model is an effective way in terms of helping students enjoy Science, understand content, and apply scientific processes and concepts to authentic situations. By cultivating student's interest in science and developing reasoning skills, this model promotes deeper understanding of the nature of science and scientific inquiry.

The implication of this study is that all pupils can be provided with an environment, which is suitable according to their interest so that their creativity may be flourished. Moreover, home & school can play important roles in developing a positive attitude, for the development of creativity among students. Teacher can use PEN model in teaching learning process in the classroom. It is the responsibility of the teachers to identify students' active performance and try to enhance their learning and thinking power through this model. In brief, it has been concluded that PEN model help the students in building strong cognitive ability and clear understanding about the topic, which should help them in a better position to reap the benefits of high academic achievement, enrolled in reliable future career choice and job availability.

The study based on development of PEN Model which can be more effective in enhancing Scientific Creativity, Scientific Interest and Achievement in Physics than Activity Oriented Method. The following are the major implications drawn from the study.

- Information on PEN model and learning style provide a useful framework for understanding learners and identifying gaps in the teaching methods.
- During the first phase of PEN Model (PBL), students' attitudes towards science as a school subject can be measured. So the teacher can teach the students on the basis of this assessment while teaching science.
- The PEN Model must strive to engage students in authentic learning experiences that initiates students into

the way the scientific thinking about science.

- During the 2nd phase (experimental learning), students are provided with disequilibrium with their existing conceptions, so that they will have to rethink and retry to reconstruct their knowledge.
- PEN Model is a constructivist approach and it gives importance to process rather than the product especially in the Explore and Extend phases of the model. Thus, curriculum programs should be based on the constructivist perspective.
- The PEN model emphasizes the constructivist concept of peer- peer interaction and greater classroom interaction in learning.
- PEN as a constructivist model has greater emphasis on learner's prior experience rather than the teachers and on the active construction of knowledge than the passive reception of information.
- Since the learning environment of the present model focus directly on students, the importance of context, authentic problems and task, discovery learning, student's prior knowledge, group projects and discussions, student choice and authentic assessment, learning concentrates on how to think and understand.

CONCLUSION

Now a days, instruction is quite different from the past mainly because it has been more specific and professional. In the 21st century the education is affected by political, cultural, economical and social dimension. It shifts the emphasis from the teacher to the student and the active role played by the student in the learning process.

To be more specific we may ask ourselves why we have not benefited from more effective classroom instruction. This question was one of the main reasons for this research study. It promotes learning through project, experiment and nurture experiential students learning cycle.

In the research study, one of the new instructional design models for science teaching was developed. It is necessary to evaluated the effect of PEN model, the new instructional model. Through active participation in various stages of projects, students can shape their ideas and experiences.

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LIST OF WEBSITES SEARCHED

- Chrome- extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.education.gov.in/sites/upl oad_files/mhrd/files/NEP_Final_English_0.pdf
- NCERT science Textbook of edition February,2006.
- PEN model format design on 3rd November 2023.
- Development of SMART lesson plan of PEN model on 5th November 2023.
- https://www.pblworks.org/what-is- pbl#:~:text=Project%20Based%20Learning%20is%20a,question%2C%20problem%2C%20or%20challenge.
- https://en.wikipedia.org/wiki/Experiment
- https://www.kent.edu/community/what-experiential-learning-and-why-it- important#:~:text=Experiential%20Learning%20is%20the%20process,classroom%20 to%20real%2Dworld%20situations.