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Education

"A STUDY ON ENHANCING PEDAGOGY OF HIGHER SECONDARY LEVEL PHYSICS"

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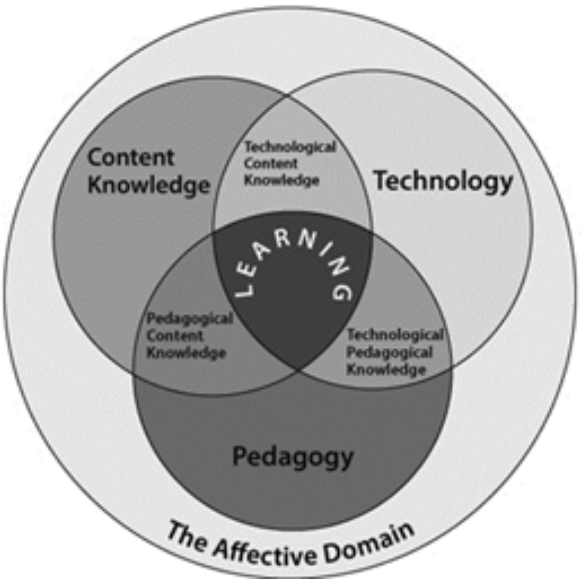
ABSTRACT This paper describes various problem faced by students in learning physic at higher secondary level. The emphasis of educational enterprises should be shifted from classroom changes to educating the instructors. Instead of simply modifying teaching practice, instructors should also undergo a transformation in beliefs and knowledge in pedagogy. It is only when all instructors are willing to undergo such a transformation that a significant achievement in teaching and learning will be realized. This article explore various options to enhancing pedagogy of higher secondary level Physics.

KEYWORDS : Physic, Teaching, Learning, Pedagogy

INTRODUCTION

Examination reports have recognized different learning issues that students insight in starting higher secondary level physic. Students carry mistaken earlier information to higher secondary level physic classes because of numerous long stretches of encountering this present reality. The so-called traditional teaching approach usually fails to rectify the incorrect prior knowledge (Mazur, 1997; Hestenes, 1998; McDermott, 2001). Students also often have difficulties in explaining real-life phenomena with the higher secondary level physic they learn. Moreover, higher secondary level physic is often considered as having little to do with the real world and more to do with plugging numbers into formulas to solve textbook problems. Although the problems have been the subject of various studies in the past three decades, many lecturers are not aware of these problems. They adopt a teaching strategy which centres on the lecturers while the students are only a passive audience thus the incorrect prior knowledge is not properly addressed.



Source: *Aggen & Jauchak, 2004, p. 239*

Traditionally, a lecturer presents the material from the textbook, models the problem solving examples and occasionally performs demonstrations. The students listen to the presentation, take notes, but rarely ask questions or give comments. In tutorial sessions, the students just copy the solutions presented by teaching assistants into their notebooks. The students may have to do some practical activities in the laboratory; but they just follow the prescribed procedures without thinking for themselves very much. Educational theories of learning provide some contributions to solving the learning problems mentioned above. According to the cognitive view of learning, learners actively modify their mental structure to make sense of the world they experience (Anderson, Reder, & Simon, 1996; Greeno, Collins, & Resnick, 1996; Mayer, 1996). The process of knowledge construction is facilitated by social interactions (Vygotsky, 1978), authentic learning experiences (Ormrod, 2003), motivation (Pintrich, Marx, & Boyle, 1993; Weinstein, 1998) and disrupting the cognitive equilibrium (Piaget, 1954).Utilizing educational principles, higher secondary level physic education researchers have put forward various strategies to assist instructors to teach more effectively. Some of these strategies aim to create a learning environment where the students are actively engaged with their instructors, peers and learning materials. The so-called interactive engagement strategies have been subject to a great number of investigations (Hake, 1998a). Published reports indicate that these strategies improve students' conceptual understanding as well as their skills in problem solving. Other approaches incorporate examples, materials and activities taken from real-life contexts with the purpose of establishing the connections between higher secondary level physic and its applications in the real world. Following model explains relation between physic content, fieldwork and Theories of teaching and learning.

Review Of Literature

Winslow Fedrik (2018) stated that "physical science is the organized knowledge of our physical environment and the method used to obtain it". Physical science studies the nonliving thing in the universe. It is clear that this is the largest and most useful tool we have for taking the occurrences of nature, of a vast variety, and making them reasonable to human"s mind.

Gilbreth L (2017) Teaching physics in English as a foreign language involves some new things. The main one is that students are learning not only the subject-matter knowledge and skills, but also the specific terminology which is the medium of instruction for that subject. Hence, the teacher and the students are supposed to do higher effort to rich the target of the study. The curriculum that is used to teach physics at the classes of immersion program is the same as those for regular class.

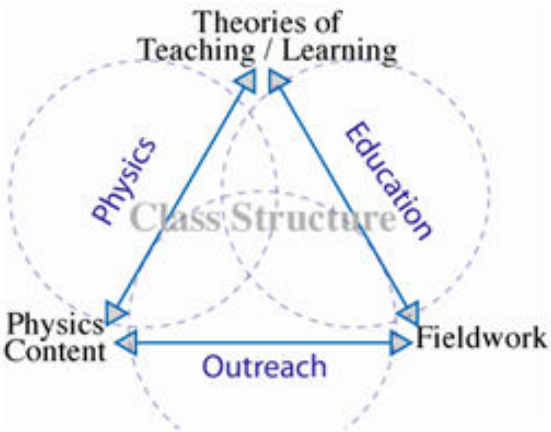
Raman P (2018) Teaching and learning process at the bilingual classes especially at immersion class program should apply learning to know, learning to do, learning to live together and learning to be. The teacher should create atmosphere of the class to be more active, effective and creative, so the students will enjoy learning in the class. Furthermore, there are some advantages of this bilingual program both for the teachers and the students; "increasing the accuracy and ability to make form-meaning connections. The term accuracy relates to correct use of linguistic structures (grammatical accuracy), appropriate use of register (sociolinguistic accuracy), precision of vocabulary (semantic accuracy), and proper use of cohesive devices.

Michel shraf (2019) supports the idea that teachers use mental scripts to help reduce the information processing demands of teaching. In contrast to Shavelson & Stern (1981), however, Mitchell and Marland found the mental scripts used by teachers to be of a more general nature and not dependent on prior planning. Mitchell and Marland identified three "frames" through which a teacher interprets his classroom environment. These frames are supported by frequently used routines. For example, they show how a teacher's "ego enhancement frame" guided his interaction with a student during interactive teaching. The teacher noticed that one, fairly quiet, student had missed a previous answer on his worksheet.

Theoretical Framework

Pedagogy and its Forms with respect to Physic at higher secondary

level: Pedagogy refers to the "interactions between teachers, students, and the learning environment and the learning tasks. This broad term includes how teachers and students relate together as well as the instructional approaches implemented in the classroom. Pedagogical approaches are often placed on a spectrum from teacher-centred to learner-centred pedagogy; though these two approaches may seem contradictory, they can often complement each other in the realisation of educational goals



Source: *Basic of Physic Teaching, 2010, p. 181*

Teacher-Centred Pedagogy of Physic:

Teacher-centred pedagogy positions the teacher at the centre of the learning process and typically relies on methods such as whole-class lecture, rote memorization, and chorus answers (i.e., call-and-response). This approach is often criticized, especially when students complete only lower-order tasks and are afraid of the teacher. However, whole-class teaching can be effective when teachers frequently ask students to explain and elaborate key ideas, rather than merely lecture.

Learner-Centred Pedagogy of Physic:

This pedagogical approach has many associated terms (e.g., constructivist, student-centred, participatory, active), but generally draws on learning theories suggesting learners should play an active role in the learning process. Students therefore use prior knowledge and new experiences to create knowledge. The teacher facilitates this process, but also creates and structures the conditions for learning. Considerable research and advocacy has promoted learner-centred pedagogy in recent years for economic, cognitive, and political reasons. Some research suggests this approach can be very effective but it is also difficult to measure consistently. It is often challenging for teachers to shift from teacher-centred pedagogy to learner-centred pedagogy, and so considerable support may be needed if this is an important goal for a given education system.

Learning-Centred Pedagogy of Physic:

"Learning-centred pedagogy" is a relatively new term that acknowledges both learner-centred and teacher-centred pedagogy can be effective, but teachers must consider the local context, including the number of students in the class, the physical environment, the availability of teaching and learning materials, etc. It suggests that teachers should be flexible and carefully adapt their pedagogical approaches based upon the school environment.

Effective and Appropriate Pedagogical Approaches for Physic: Effective pedagogy can lead to academic achievement, social and emotional development, acquisition of technical skills, and a general ability to contribute to society.

RESEARCH METHODOLOGY

Research Methodology outlines the research strategy and denotes the systematic analysis of the methods that are best suited for the current research study. It provides the theoretical considerations that guide the research process.

Research Design

The main purpose of research design is to ensure that the research conducted and data collected effectively and conclusively answer the research question. Research design articulates the data required, the relevant methods to be used for data collection and analysis to with the ultimate objective of answering the research question. Quasi-experimental design was used for this study.

Sampling

Sampling is a method of selecting a subset of the population, referred to as sample that allows us to draw conclusions about the entire population by analyzing the characteristics of the sample based on statistical tools. Sampling makes the research study cost efficient and time saving while providing accurate insights about the entire population that is being studied. Stratified sampling was used.

Data Collection

Data was collected from secondary school which comprised of 7 sections of grade 11 and 6 sections of grade 12 with a total of 587 students. Students in this school are mainly from factory workers and farming families from the town and nearby agricultural fields.

Data Analysis

The data collected are carefully analyzed & taken by using all sort of relevant statistical techniques and using the foremost appropriate test. the information collected are carefully analyzed & interpreted. statistical tool ANOVA was used to draw significant references.

CONCLUSION

It can be concluded that teacher, on the one hand, subjectively decides on the design of the content, methods, strategies, and technologies of education, but the implementation of educational reforms depends on him. On the other hand, the state and society broadcast the pedagogical culture, the value aspects of teachers' thoughts through professional, vocational training, and the system of raising teachers' qualifications. The subjectivity of consciousness and professional activity is one of the principles of modern pedagogical physic. That is, the application or nonuse of innovative methods depends on the personality of the teacher, his methodological competence, pedagogical skills. The task of the teacher training system is to actualize such a need, to form methodological competence. The task of the school and universities is to encourage and stimulate the development of teachers' and students' creativity. An important task of the physic teacher is to constantly reflect and develop his pedagogical potential; then the student influenced by the example of the teacher will be an active and competent person. Despite empirical evidences and the emphasis on active and student-centered Physic teaching in the numerous training attempts, teachers are predominantly using teacher centered direct instruction in physic therefore, the most feasible introduction of student-centered instruction such as peer tutoring is in some combination with the dominant direct instruction in physic will be optimal solution of this problem.

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