



ORIGINAL RESEARCH PAPER

Education

PEDAGOGICAL CHALLENGES IN PHYSICS AND RELEVANCE OF FIELD DEPENDENCY

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ABSTRACT

When a country's citizens are highly educated, it may develop. In recent years, science & technology education has become the pillar of growth. Without physics, there will never be a greater knowledge of science and technology. The research focuses on high school students. Students' pedagogical difficulties in studying Field Dependency in Physics. Physics is often depicted as an abstract topic that has nothing to do with reality. Field Independent students make more progress than Field Dependent students because independent students have more confidence and comprehension. The research is based on a survey of 500 students from rural and urban upper secondary schools who are bilingual (Hindi and English).

INTRODUCTION

This research looks at the difficulties that higher secondary students have while studying Field Dependency in Physics. Physics is regarded as one of the most difficult subjects in secondary school (Colletti, 2010). Physics topics are still not connected to real-life situations by secondary school instructors (Ramma et al., 2006). As a result, kids spend the whole year in the classroom with the same process, organisation, assets, questions, and evaluation techniques, which becomes tiring for the students. Students are not only unable to understand and apply scientific concepts in such circumstances. The research moves on with the hypothesis that the Field Independent learner may concentrate on the most essential aspects of tasks while ignoring the less significant aspects. Similarly, when confronted with a Physics issue (laws and numerical problems), the Field Independent learner may extract information from the question to aid in obtaining a solution. As a result, the purpose of this research is to examine how field dependence/independence affects student physics learning.

Review Of Literature

Witkin and Goodenough (1981), "It's extremely difficult to separate the items from their structure or basis," says Field Dependency (FD) as an individual. It's also difficult for those who have a good understanding of the administering profession or setting. Individuals may accomplish things independently of a purposeful imaginary field and its particular circumstances when they are field free (FID).

Erdemir and Bakirci (2019) The tendency for individuals who organise their ideas, emotions, and practises towards the mental piece is described as physics mentality. Individuals are not born with tendencies to which they will subsequently adjust. A few mindsets are based only on knowledge, information, and abilities, while others are acquired from many sources. Whatever the case may be, the mental state does not stay unchanged. It evolves over time and in little increments.

Adensina and Kinbobola (2018) When confronted with fresh information and new experiences, portray understudies/people groups constantly construct new frames of mind and modify existing ones. The topic of material science is seen to be the most dangerous in the world of Science. The contrary, physics enrollment & interest in High-Schools have been rising years after years, reversing the trend toward martial arts. Students who opt to pursue their studies under the area of physic's are also dissatisfied from the rates of high drop-out in the Control-Group.

Witkin & Goodenough(1981) described a field of the

subordinate as a person who is unable to detach an item from its context. "The ability to resist implant settings in perception functioning, & it is regarded as the coherent element of an enunciate model of field approach as conveyed in conclusion,"

Goodenough (1976) said of the difference between field dependence and field freedom. Field dependence, on the other hand, refers to those who take the field's connection in perceptual and critical thinking tasks for granted, and who have difficulty separating an item from this particular position". The field self-dependence/ independence dimensionalities may be used to a wide range of educational issues. As a result, it is necessary to investigate the field dependence level, learning-experiences, & perspectives students of Physics aged 14 to 18.

Significance Of The Study

The research aims to learn more about the conceptual difficulties that students face in secondary school Physics in general, and in Dehradun in particular. This study, I believe, will aid pupils in gaining mastery of subject knowledge in Physics at the subordinate level. There implies to be a significant gap among what students expect & what occurs in classrooms & labs where students study Physics. This research may lead to new methods of understanding physics numerical issues, which are a frequent difficulty for the majority of pupils in secondary school.

OBJECTIVES OF THE STUDY

This research will look at students' views, experiences, and difficulties in studying Physics, as well as the possible causes and reasons for such issues.

The following are the goals of this research:

- i. To discover what secondary school students think about Physics classes.
- ii. To discover what higher secondary students think are the most difficult aspects of their Physics classes.
- iii. To determine the Field Dependency of higher secondary students in Physics as a function of gender and age.

Research Questions (RQS)

The following questions are addressed in this research:

- RQ1. What does physics education mean to higher secondary students?
- RQ2. What are higher secondary students' perceptions of physics challenges?
- RQ3: What is the connection between Field Dependency and the gender and age of Physics students?

RESEARCH METHODOLOGY

A data collecting instrument is included in the study design. To begin, this research utilised a questionnaire to ask upper secondary school students about their views and difficulties in studying Physics. Second, to determine the degree of Field Dependency, the Johnston experiment test was performed. The remarks about the pupils' views of physics and difficulties in studying school Physics were included in the questionnaire. This study includes a quantitative research technique to explain why those approaches were appropriate and how research tools such as questionnaires were created and delivered. In addition, tools such as the Group embedded figure test and the Johnston experiment exam were used in classrooms. A total of 500 male & female students from public & private schools make up the sample. Each district's schools are chosen from both the public and private sectors. The schools are drawn from both rural and urban regions on an equal footing.

Findings Of The Study

This research included 500 male & female students from both public & private institutions. The sample's demographic make-up is detailed/summarized in the table. Because of trends in science and education, female students from private upper secondary schools in metropolitan regions are much higher than male students. The pupils were mostly in the fifteenth grade, which has a larger number of students than the other grades from 14th to 18th. The majority of upper secondary students in the 10th and 12th grades participated evenly, which is somewhat higher than the 9th and 11th grade pupils. Because their parents' income is modest and prudent, the bulk of students come from mediocre households with lower incomes. It is clear that the majority of the students that took part in the study were able to grasp Physics concepts quickly. The majority of students answered that they completely understand the Physics courses because they believe their instructors deliver the Physics subjects in a more effective manner, and they like the skills and methods used in Physics class. Most of students like working in the Physics research facility since they enjoy in the involved useful and exploratory work. The home assignment is disliked by many pupils since they cannot do it on their own. As a result, the maximum students believe that tutoring is required in order to get high grades in the physics. The maximum students felt that they possessed sufficient energy for survey at school, but that revising the annual curriculum is difficult, which is why they are worried about the Physics test. As a result, most of understudy members favored numerous decision questions since they accept they are easy to reply to and are not planned. Even so, as shown in the table above, most students believe that if they are having difficulties, they should speak with their instructor for assistance, also, the greater part accept that instructor addressing assists them with fathoming the Physics addresses. Based on student answers, the quickly above table shows that most of male and female understudies accept that Physics is a subject they like. The majority of school students disagree that Physics is a dull topic, as shown by the answers in the table above. They believe Physics to be an engaging, thought-provoking, and easy-to-remember subject. As a result, the majority of students said that Physics is a difficult and challenging topic that will assist them in advancing their careers.

DISCUSSIONS

The goal of this study was to find out how students felt about physics learning and what obstacles they faced. The first study question inquired about the students' understandings of Physics and their attitudes about the subject. This is the current educational trend in Dehradun, especially in public schools. In the Dehradun Public School, the majority of the pupils are from the lower or middle classes of society, with lesser earnings. They are forced to teach and study using outdated techniques such as lectures and with limited resources due to a lack of contemporary facilities. The

majority of male and female participants in this research study had a favourable attitude toward Physics learning. The majority of the students had good feelings about the topic of physics, with the majority stating that they understand and like the subject, and that they are excited to study it. The pupils had a positive impression on their book study and Physics understanding. Physics is often seen by students as a dull, difficult, and uninteresting subject, despite the fact that this perception is rather contradictory. Furthermore, the findings indicate that physics is an intelligible topic since it was able to offer advice and further assist them in their future job possibilities, which contradicts prior findings from other research studies conducted across the globe.

CONCLUSIONS

The findings of this research were used to investigate their learning in Physics, as well as their views and difficulties. Furthermore, overall, students have a somewhat high inspiration for learning Physics, and that most of students show that practically all understudies see Physics well as far as learning, taste, premium, and comprehension. At expansion, no huge contrasts were seen among male and female students points of view on learning Physics in school. Even so, there was a substantial difference between urban and rural pupils in terms of motivation and curiosity. Because city schools have more resources and possibilities, kids are more excited about studying Physics in the city. Furthermore, the association values between field dependence and student age indicate that as students become older, field dependency improves their performance as well as their accomplishment.

Recommendations

The following recommendations were made to the students, instructors, and Physics curriculum creators in this study:

- Students should be conceptually taught physics using contemporary teaching techniques rather than old ones, particularly before formulae, numerical problems, and Physics equations are taught.
- To make pupils more field independent, a variety of instructional techniques should be utilised.
- Rather than memorised learning, emphasis should be placed on improving pupils' knowledge, conceptual thinking, and understanding.

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