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Achievement In Physics Of Higher Secondary Students In Relation To Self-Regulated Learning

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ABSTRACT

Aiming to research the link between self-regulated learning and academic performance in physics among higher secondary students, the current study named "performance in Physics of Higher Secondary Students in Relation to Self-Regulated Learning" sets out to do just that. Mayiladuthurai District, Tamil Nadu, India, was the site of the study, which included both public and private high schools. Using a simple random selection approach, 670 kids from various government, aid, and private schools were chosen for the XI standard. Data on students' physics achievement levels and techniques of self-regulation of learning were collected by survey methods in this research. The relationship between academic achievement and self-regulated learning techniques was investigated statistically. Educators, curriculum developers, and legislators seeking to enhance scientific education results at the upper secondary level may benefit greatly from the study's findings, which emphasise the importance of self-regulated learning in raising students' physics ability.

Keywords: Achievement in Physics, Higher Secondary Students, Self-Regulated Learning.

I. INTRODUCTION

In the rapidly evolving landscape of education, the ability to learn independently and effectively has become a critical determinant of academic success. Self-regulated learning (SRL) refers to the process through which learners actively control their own learning experiences by setting goals, monitoring progress, and reflecting on outcomes. This concept is particularly significant in the context of science education, where complex concepts and problem-solving skills demand a high degree of cognitive engagement and autonomy.

Physics, as a core subject in the higher secondary curriculum, plays a pivotal role in shaping students' analytical and reasoning abilities. However, students often face challenges in mastering physics due to its abstract concepts and mathematical rigor. Integrating self-regulated learning strategies can potentially bridge this gap by fostering motivation, enhancing comprehension, and improving academic performance.

This research looks at secondary school pupils in Mayiladuthurai District, Tamil Nadu, India, to see how self-regulated learning relates to their physics grades. The goal of this project is to help educators and policymakers improve physics education by analysing the effects of various self-regulated learning strategies on students' academic performance. Inspiring students to take charge of their own learning and achieve high academic standards in science classes is the overarching goal of this research.

II. NEED AND SIGNIFICANCE OF THE STUDY

Physics is a foundational subject in science education, promoting critical thinking, problem-solving, and analytical skills. However, many higher secondary students struggle with achieving high performance in physics due to various academic and psychological factors (Singh & Raj, 2020). While cognitive abilities play a role in academic success, recent studies highlight the importance of psychological and behavioural traits such as self-esteem, perseverance, and self-regulated learning in shaping students' academic outcomes (Zimmerman & Schunk, 2011). Another critical factor influencing achievement is self-regulated learning (SRL), which refers to students' ability to plan, monitor, and evaluate their learning strategies (Pintrich, 2000). SRL enables students to develop effective study habits, manage time efficiently, and seek appropriate resources, thereby enhancing their performance in complex subjects like physics (Schunk & Zimmerman, 2008). Despite growing recognition of these psychological factors, there remains a gap in research on how self-esteem, perseverance, and self-regulated learning collectively impact physics achievement among higher secondary students.

III. STATEMENT OF THE PROBLEM

The topic chosen for the present study is entitled as '**Achievement in Physics of Higher Secondary students in relation to Self-Esteem, Perseverance and Self-Regulated Learning'.**

IV. OBJECTIVES OF THE STUDY

The following are the objectives of the present study:

1. This study aims to assess the physics and self-regulated learning proficiency levels of secondary school pupils.
2. Examine the correlation between high school students' ability to self-regulate their learning and their physics performance.
3. In order to learn how Self-Regulated Learning affects Physics Performance.
4. The goal of this study is to determine the effect of independent factors and subsamples on physics achievement in high school.

V. METHOD OF STUDY

Location of The Study

Location of the present study is Mayiladuthurai District, Tamilnadu, India is the Location selected of this study. The Government and Private schools located in this area was chosen for sample selection.

Sample And Sampling Technique

- **Sample of the study:** The sample of the study consists higher secondary students studying in Mayiladuthurai District of Tamilnadu.
- **Sampling technique:** Simple Random sampling technique was adopted in this study. XI standard students studying in Government, Aided and Private higher secondary schools were randomly selected for the survey. A sample of 670 higher secondary students were included in this study.

Statistical Techniques Used

In the present investigation the following Statistical techniques were applied for analyzing the collected data:

a. Descriptive Analysis
b. Differential Analysis
c. Correlation Analysis
d. Regression Analysis

Tools Used for The Study

1. **Achievement in Physics** Half-Yearly marks were collected from the school records.
2. **Self-Regulated Learning Scale (2023)** constructed and validated by Ahila.R and Ambedkar.V

VI. OPERATIONAL DEFINITIONS OF THE TERMS

a) Achievement in Physics:

"Achievement represents the extent to which a learner has attained the intended learning outcomes in a specific subject or domain."

In this study, Achievement in physics refers to the extent to which the higher secondary students has successfully attained specific knowledge, skills, or understanding in the domain of physics, measured through an achievement test.

b) Self-Regulated Learning

" The term "self-regulated learning" refers to the process by which an individual plans and cyclically adapts their own thoughts, emotions, and behaviours in order to achieve their own objectives.."

In this study, Self-regulated learning (SRL) refers to the process by which the higher secondary students actively manage their own learning experiences through planning, monitoring, and reflecting to achieve academic goals.

VII. FINDINGS OF THE STUDY

Descriptive Analysis

1. The level of the Achievement in Physics of Higher Secondary Students is average.

2. It is found that out of 670 students, 20.15% of Higher Secondary Students are having low level of Achievement in Physics; 61.19% Higher Secondary Students are having average level of Achievement in Physics and 18.66% Higher Secondary Students are having high level of Achievement in Physics.
3. The level of the Self-Regulated Learning of Higher Secondary Students is average.
4. It is found that out of 670 students, 18.66% of Higher Secondary Students are having low level of Self-Regulated Learning; 63.43% Higher Secondary Students are having average level of Self-Regulated Learning and 17.91% Higher Secondary Students are having high level of Self-Regulated Learning.

Differential Analysis

1. When comparing the physics scores of male and female students in high school, a clear gender gap emerges.
    - In terms of overall performance, female students outperform their male counterparts on the Achievement in Physics test.
2. Depending on where they live, rural and urban high school students perform quite differently in physics.
    - While comparing the mean scores, Students from urban residence are relatively higher in Achievement in Physics than from rural residence.
3. There is a significant difference in Achievement in Physics Tamil and English Medium Higher Secondary Students with respect to Medium of Instruction.
    - Students enrolled in the English Medium tend to outperform their Tamil Medium counterparts when it comes to Achievement in Physics, according to the mean scores.
4. Depending on the kind of management, public, assisted, and private high school students perform quite differently in physics.
    - Achievement in Physics is somewhat greater among secondary school students attending private schools as compared to those attending publicly or privately funded institutions.
5. Students in the Bio-Mathematics, Pure Science, and Computer Science streams of higher education do quite differently in Physics.
    - While comparing the mean scores, Higher Secondary Students studying in Computer Science stream are relatively higher in Achievement in Physics than those who are studying in Bio-Mathematics and Pure Science.
6. For the rest of the groups based on Type of Family, Father's Education, Mother's Education and Type of School the mean difference is not statistically significant.
7. There is a significant difference in Self-Regulated Learning between Male and Female Higher Secondary Students based on Gender.
    - While comparing the mean scores, Female Higher Secondary Students are relatively higher in Self-Regulated Learning than their Male counterparts.
8. There is a significant difference in Self-Regulated Learning between Tamil and English Medium Higher Secondary Students based on Medium of Instruction.
    - While comparing the mean scores, English Medium Higher Secondary Students are relatively higher in Self-Regulated Learning than Tamil Medium students.
9. There is a significant difference in Self-Regulated Learning among the Higher Secondary Students who are studying in Girls, Boys and Co-Education based on Type of School.
    - While comparing the mean scores, Higher Secondary Students studying in Girls School is relatively higher in Self-Regulated Learning than those who are studying in Boys and Co-Education schools.
10. There is a significant difference in Self-Regulated Learning among the Higher Secondary Students who are studying in Government, Aided and Private schools based on Type of Management.
    - While comparing the mean scores, Higher Secondary Students studying in Private schools are relatively higher in Self-Regulated Learning than those who are studying in Government and Aided schools.
11. For the rest of the groups based on Student's Residence, Type of Family, Father's Education, Mother's Education and Stream of study the mean difference of Self-Regulated Learning is not statistically significant.

Correlation Analysis

1. There exists a positive and significant relationship between Achievement in Physics and Self-Regulated Learning of higher secondary students.

Regression Analysis

1. Self-Regulated Learning significantly contributed on Achievement in Physics of higher secondary students.

VIII. CONCLUSION

In conclusion, this study underscores the critical role of self-regulated learning in influencing the academic achievement of higher secondary students in physics. The findings highlight that student who actively engage in self-regulated learning strategies, such as goal setting, self-monitoring, and reflective practices, tend to perform better academically. This relationship emphasizes the need for integrating SRL techniques into physics instruction to enhance student motivation, understanding, and problem-solving abilities. The study conducted in Mayiladuthurai District, Tamil Nadu, provides valuable insights for educators, curriculum developers, and policymakers aiming to improve physics education outcomes. By fostering an educational environment that encourages self-regulated learning, schools can better prepare students to meet the challenges of advanced scientific studies and real-world applications. Ultimately, promoting self-regulated learning not only improves academic performance in physics but also equips students with lifelong learning skills essential for personal and professional growth.

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