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Exploring The Self-Regulatory Strategy Of Learning And Level Of Self-Efficacy Beliefs And Task Value Of Physics Students

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ABSTRACT

This study looks at the self-regulatory learning approach and its relationship to self-efficacy beliefs and task value in physics students. The purpose of this research is to investigate the elements that influence students' involvement and motivation in the field of physics education. The study's findings suggested that students used self-regulation tools such as goal setting, planning, monitoring, and self-reflection to improve their physics learning outcomes. Furthermore, the findings indicated a positive relationship between students' self-efficacy beliefs and their use of self-regulatory mechanisms, emphasizing the importance of self-beliefs in motivating and directing students' academic endeavors. According to the findings, students' task value perceptions, which include their interest, importance, and utility beliefs about physics, have a considerable impacted on their engagement and motivation in the subject. Students who saw physics as personally significant and relevant are more likely to use self-regulation skills and have greater levels of self-efficacy.

Keywords: self-regulatory strategy, level of self-efficacy belief, task value, learning outcomes

INTRODUCTION

Understanding the elements that affect students' academic performance and attitudes toward learning is crucial in the field of education. Physics is one of many courses studied at the secondary and tertiary levels, but because of its abstract character and difficult concepts, it frequently presents students with special difficulties. Students need strong self-efficacy beliefs, effective self-regulatory methods, and a high awareness of task worth in order to overcome these obstacles and succeed in physics education (Roesken, Hannula & Pehkonen, 2011).

The purpose of this study is to examine the self-regulation techniques used by physics students and the connection between their task importance, self-efficacy beliefs, and academic achievement. The cognitive, metacognitive, and motivational processes that students use to plan their learning, set objectives, assess their progress, and make necessary adjustments to their techniques are referred to as self-regulatory strategies (Baram-Tsabari, Sethi, Bry & Yarden, 2010). These techniques are essential for promoting successful learning and academic success.

Contrarily, students' self-efficacy beliefs include their confidence in their ability to complete tasks and overcome challenges. Self-efficacy beliefs have an impact on students' tenacity, motivation, and amount of effort put into their learning in the setting of physics education. A high level of self-efficacy develops a favorable attitude toward physics as a discipline in addition to improving academic achievement.

The term "task value," which is a crucial element of the expectancy-value theory, relates to how important, interesting, and practical the learning activities are in the eyes of the students. Students' task value views have a significant role in determining their engagement, motivation, and desire to put forth effort in learning physics topics and solving problems.

Teachers, curriculum designers, and policymakers can gain important insights about how self-regulatory methods, self-efficacy beliefs, and task value interact with one another in physics students (Selçuk, Çalışkan, & Erol, 2008). Educators can improve students' learning experiences, engagement, and accomplishment in physics education by developing efficient self-regulatory mechanisms, encouraging positive self-efficacy beliefs, and emphasizing task worth.

The results of this study could guide educational policies and initiatives that improve physics instruction and foster a supportive learning environment. The ultimate aim is to equip physics students with useful learning techniques, strengthen their self-efficacy beliefs, and foster a profound understanding for the importance of physics education, which will result in improved academic performance and a lifetime interest in the topic.

STATEMENT OF THE PROBLEM

This study aim to investigate whether second year students' examination scores in Physics are influenced by the use of self-regulatory practices during test preparations and after taking the test. Specially, it sought answer to the following questions.

1. What is self-regulatory strategy of learning that respondents employ before taking the test?
2. What is the level of self-efficacy beliefs and task value of the respondents taking Physics subject?

METHODOLOGY

In order to determine the second-year students' self-efficacy beliefs and task value at Cagayan State University at Aparri for the academic year 2017–2018, the study employed a descriptive–correlational methodology. The description of information and traits pertaining to a specific responder was the focus of the descriptive methodology. The objective is to gather true, precise, and organized data that may be utilized to compute averages, frequencies, and other statistical calculations. In this study, the task value and self-efficacy views were discussed, along with how these factors affected second-year students' performance in Physics 11. Because it assessed how much students' levels of self-efficacy beliefs affected their learning, the study is also correlational. During the academic year 2017–2018, the study was carried out in Cagayan State University's College of Information and Computing Sciences and College of Education.

RESULTS AND FINDINGS

Self-Regulatory Strategy Of Learning

The score of the learning techniques used by the respondents before to the Physics exam is shown in Table 2. With a score of 212, it demonstrates that goal-setting and planning were ranked first. Goal setting and planning are defined as statements that inform students of educational goals or subgoals and planning for the sequencing, timing, and completion of activities linked to these goals. Examples of this are "I start studying once a week before exams" and "I work hard to pass this subject."

This suggests that, in order to prepare for their exams, the majority of the respondents created educational goals and planned the sequencing, timing, and completion of tasks related to those goals.

Statements like "I review my notes" and "I review my quizzes" that indicate students made an effort to reread tests and notes in order to get ready for class or future testing are classified as reviewing records. Rereading tests came in second with a score of 135, while rereading notes came in eleventh with a mark of 27.

Self-evaluation was placed third with a score of 126. Statements like "I check over my answer to make sure that it is correct" and "I check over my solution to make sure I solved it right" are examples of student-initiated self-evaluation of the quality or progress of their work.

Statements like "I just do what my teacher says" and "I follow my seatmate's advice" were ranked 4 with a score of 120, showing learning behavior that is begun by other people such as teachers or parents.

Keeping track of things and monitoring is ranked fifth with a score of 97. Statements like "I take notes during class discussion" and "I keep my test papers for my review material" are examples of student-initiated efforts to document occurrences and are classified as keeping records and monitoring.

Getting social support from others rated sixth with a score of 94. We classify statements like "I ask my friend to help me when I cannot understand" as an example of student-initiated initiatives to seek social assistance from peers.

With a score of 76, practicing and memorizing is rated seventh. Rehearsing and memorizing are phrases used to describe pupils who make an attempt to learn content via repetition, such as "I keep solving problems until I master it" and "I keep writing formula until I can remember it."

Getting social aid from teachers was ranked eighth with a score of 63. Statements like "I ask my teachers help if I cannot understand our lesson" and "I ask my teachers to guide me when I cannot solve the problem" are examples of pupils asking for social support from teachers.

Information seeking was ranked ninth with a score of 54. When completing an assignment, statements like "I research in the library to answer my assignment" and "I seek information from the internet to get much information about our topic" are categorized as efforts made by students to obtain additional task information from encyclopedias or the internet.

Environmental structure was ranked 10 with a score of 36. Statements like "I stay away from my classmates when I review" and "I turn off the television when I review so I can concentrate on it" are classified as environmental structuring because they show students making an effort to choose or create a physical environment to facilitate learning.

Self-consequences came in at number 12 with a score of 25. Self-consequences are phrases like "If I do well on a test I will be given a high grade in Physics" and "If I will not pass this subject my parents may ask me to stop" that show students' arrangement or conception of incentives or punishment for success or failure.

Organizing and transforming is the strategy category that had the lowest score and is ranked 13th. For example, "I review first my lesson before trying to figure out the formula and solution of a problem" and "I carefully read the problem and analyzed it before identifying the given, unknown, and the formula to be used to solve it" are examples of statements that show students organized instructional material to improve learning. These statements fall under the organizing and transforming category.

Table 2:Learning strategies of the students before taking the test

CATEGORIES OF STRATEGIES	SCORES	RANK
1. Self-evaluation	126	3
2. Organizing and transforming	21	13
3. Goa-setting and planning	212	1
4. Seeking information	54	9
5. Keeping records and monitoring	97	5
6. Environmental structuring	36	10
7. Self-consequences	25	2
8. Rehearsing and memorizing	76	7
9. Reviewing records-reread tests	135	2
10. Reviewing record-reread notes	27	11
11. Statements indicating learning behavior that is initiated by other persons and unclear verbal responses	120	4
*Multiple responses		

LEVEL OF SELF-EFFICACY BELIEFS AND TASK VALUE

Table 3 reveals that out of 14 items, the respondents rated one item as "undecided" with a weighted mean of 3.37, ten items were "true of me" and three items were rated "very true of me". An overall weighted mean of 3.87 was taken which corresponds to a descriptive rating of "true of me". I think I will be able to use what I learn in Physics in other subjects with a mean of 3.96; I am certain I can understand the most difficult topic presented in the reading for Physics with a mean of 3.44; I am confident I can understand the most complex topic with a mean of 3.57; I am very interested in the content area of Physics with a mean of 4.19; I am confident I can do an excellent job on the assignments and test in Physics with a mean of 3.73; I expect to do well in Physics with a mean of 3.97; I like the subject matter in Physics with a mean of 3.55; I am certain I can master the skills being taught in Physics with a mean of 3.52; and Considering the difficulty in Physics, the teacher, and my skills I think I will do well with a mean of 3.86.

This finding implies that the respondents have higher level of self-efficacy beliefs.

Table 3:Self-efficacy beliefs and task value

STATEMENTS	WEIGHTED MEANS	DESCRIPTIVE VALUE
1. I think I will be able to use what I learn in physics in other subjects.	3.96	True of me
2. I believe I will receive an excellent grade in Physics.	3.37	Undecided
3. I am certain I can understand the most difficult topic presented in the reading for Physics.	3.44	True of me
4. It is important for me to learn the topic in physics.	4.44	Very true of me
5. I am confident I can learn the basic concepts taught in Physics.	4.01	True of me
6. I am confident I can understand the most complex topic presented by the instructor in Physics.	3.57	True of me
7. I am very interested in the content area of Physics.	4.19	True of me
8. I am confident I can do an excellent job on the assignment and test in Physics.	3.73	True of me
9. I expect to do well in Physics	3.97	True of me
10. I think the topics in Physics are useful for me to learn.	4.31	Very true of me
11. I like the subject matter in Physics	3.55	True of me
12. Understanding the subject matter in Physics is very important for me.	4.32	Very true of me
13. I am certain I can master the skills being taught in Physics	3.52	True of me
14. Considering the difficulty in Physics the teacher and my skills I think I will do well.	3.86	True of me
General weighted mean	3.87	True of me

SCALE	DESCRIPTIVE VALUE
1.00 - 1.79	Not at all true of me
1.80 - 2.59	Not true of me
2.60 – 3.39	Undecided
3.40 – 4.19	True of me
4.20 – 5.00	Very true of me

DISCUSSION

In physics, the self-regulatory learning method entails a series of processes and techniques that students use to actively monitor, control, and regulate their learning experiences in the subject. Physics, as a complicated and theoretically demanding field, necessitates a strategic approach in order to grasp and implement its concepts effectively. Self-regulated physics students engage in numerous crucial actions. To begin, they establish defined goals, both short- and long-term, to provide a clear direction for their learning journey. These objectives could include mastering specific physics ideas, increasing problem-solving skills, or meeting certain grade requirements. Second, self-regulated students arrange and organize their study time and resources. Furthermore, self-regulated physics learners adopt a variety of metacognitive methods. They constantly assess their comprehension of the content by asking themselves questions, summarizing key concepts, and reflecting on their progress. Metacognition assists people in identifying areas of weakness or misunderstanding, allowing them to seek clarification or extra resources as needed. Self-regulated learners also employ cognitive methods to actively analyze and encode physics knowledge. To deepen their comprehension and improve their ability to apply physics principles in varied circumstances, they use techniques such as elaboration, visualization, concept mapping, and problem-solving procedures.

Self-regulation also entails controlling one's motivation and emotions. Physics may be a difficult subject, and self-regulated learners utilize ways to sustain motivation and efficiently deal with disappointments or failures. To stay motivated and persevere despite problems, they may employ self-reward systems, seek encouragement from classmates or teachers, or participate in positive self-talk. They also manage their emotions by recognizing and addressing stress, worry, and negative thoughts that may impede their learning progress.

Goal-setting, planning, metacognitive and cognitive methods, motivation and emotion management, and reflection are all part of the physics self-regulation strategy. Students can take an active role in their physics learning process, improve their comprehension and performance, and build lifelong skills that go beyond the study of physics by using these tactics.

The level of self-efficacy beliefs and task value has a considerable impact on students' physics performance and engagement. Self-efficacy is an individual's belief in their own ability to complete a certain task successfully. Students with high self-efficacy beliefs in physics believe they are capable of comprehending and implementing physics subjects effectively. They approach physics problems with confidence and perseverance, seeing difficulties as chances for growth rather than impediments. Students who believe in their own skills are more likely to engage actively in physics learning, seek more resources when necessary, and persevere despite challenges.

The importance and relevance that students place on a given task or subject is referred to as task value. Students with a high task value regard physics as significant, fascinating, and relevant to their aims and aspirations. They grasp physics' real-world applications and realize its importance in diverse scientific and technological advances. This perception of task value boosts their motivation and engagement, as students are more inclined to devote time and effort to comprehending and learning physics ideas.

Self-efficacy beliefs and task value are linked and influence one another. Students that have high self-efficacy beliefs value physics more because they believe their efforts will result in successful outcomes. Students who perceive a high task value in physics, on the other hand, are more likely to establish and sustain high self-efficacy beliefs because they grasp the significance and importance of their efforts in mastering the topic.

Poor self-efficacy beliefs and poor task value, on the other hand, can impede students' performance and engagement in physics. Students who have poor self-efficacy views may doubt their ability, feel overwhelmed by the complexity of physics, and are more likely to give up when presented with problems. Similarly, students who perceive poor task value may struggle to find motivation and may not understand the significance of physics in their life or potential job pathways.

Educators may build a supportive and engaging learning environment that pushes students to actively participate, persevere through hurdles, and eventually succeed in their comprehension and application of physics topics by developing strong self-efficacy beliefs and task value.

CONCLUSION

Self-efficacy beliefs and task value have a mutually reinforcing relationship. Students with strong self-efficacy beliefs are more likely to find value in their assignments because they believe their efforts will result in effective outcomes. Students, on the other hand, are more likely to establish and sustain strong self-efficacy beliefs when they realize the significance and relevance of their efforts in obtaining academic achievement.

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