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TEST PREPARATION AND TEST-TAKING STRATEGIES OF HIGH AND LOW MATHEMATICS LEARNERS

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Abstract

During the pandemic, this research investigated the difficulties experienced by college students in virtual mathematics classes. The study discovered that many students needed to engage more in higher-order mathematical thinking and instead focused on shallow reviewing of formulas and facts without attempting to understand and reason mathematically. The study recommends that instructors recognize students' weaknesses in study strategies and provide instructional interventions for test-taking and study skills to improve student performance in mathematics tests and other subject areas. The study also found a significant difference in test-taking strategies based on students' final grades. High-achieving students displayed a strong interest in mathematics, while those with lower grades demonstrated a weaker interest. Attribution theory linked motivation to the reasons behind success or failure and was closely associated with test-taking strategies. To facilitate access to advanced mathematical learning for all students, including those with low achievement, the study suggests schools should be flexibly organized to offer personalized mathematics programs. Teachers' use of cooperative instructional strategies to teach mathematics and other subjects in higher education is also recommended to enhance learning in higher levels of cognitive domains to address future challenges.

A. RATIONALE

The COVID-19 pandemic has affected every aspect of the lives of the Capiznons, including education. Students in Roxas City, Capiz, Philippines, have faced significant challenges due to the pandemic, from sudden school closures and the shift to online learning to social isolation and limited access to resources. The pandemic has also brought to light pre-existing issues in the education system, such as the digital divide, unequal access to education, and the need for greater flexibility and innovation in teaching and learning. In this context, it is essential to understand the effects of the pandemic on students in terms of test preparation and test-taking strategies of the high and low mathematics achievers and to explore potential solutions that can help mitigate the impact of potential global disasters on their education and well-being.

Many factors affect the success of students in exams. These include the school, the teacher, the quality of education, the methods of teaching, the teaching and learning equipment, the other student with whom one studies, personal studying habits, motivation, and test-taking anxiety. Even if all the factors affecting the student's success in the exam are positive, it is still necessary to have special preparation in the methods of responding to exam questions and to use appropriate strategies during the examination to be successful (Bicak, 2013)

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Constructing math test questions, especially the multiple-choice test items, is not an easy task for a math teacher because one has to consider the factors that would contribute to the success and failure of the students in exams. The cognitive level of the students, the length of time consumed during answering the items, and the options in constructing math test questions. Most often, students who take math exams find it hard to find the correct answer. Some do not have answers, some pass the paper beforehand, and others exceed the time allotted for the test. As a result, only a few got a passing score. The situation repeats every major exam.

With this premise, the researcher would like to discover the factors behind the students' failure or success in taking the exam, especially during the pandemic.

B. SPECIFIC OBJECTIVES

1. What are the test preparation strategies that students use in Mathematics?
2. What are the test-taking strategies that students use in Mathematics?
3. Is there a significant difference in students' test preparation when grouped according to grade in math?
4. Is there a significant difference in the test-taking strategies of students when grouped according to grade in math?
5. Is there a significant relationship between test preparation and test-taking strategies of high and low mathematics achievers?

C. SIGNIFICANCE OF THE STUDY

The findings of the study were significant for the following:

Students. This study helps the students to identify their strengths and weaknesses in test preparation and to assess their test-taking strategies. These test-taking strategies will be a helpful tool for them to re-adapt to the sudden shifts in the teaching-learning modalities.

Teachers. This study helps educate teachers about the differences between students in terms of test preparation and test-taking strategies to provide valid tests even when the teaching-learning process changed due to remote learning.

Administrators. This study serves as a reference for school administrators who can help to understand students' needs further and to develop a flexible curriculum tailored to their needs during a global crisis that will help students prepare to take tests based on their strengths and weaknesses.

D. REVIEW OF RELATED LITERATURE

In the last several decades, many researchers have investigated the effects of study strategies on students' academic performance. Differences in strategy use between high and low achievers indicate that some systems benefit learning, retention, and information

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retrieval. In contrast, other strategies are not beneficial and may lead to poor academic performance (Kitsantas, 2002).

In the study by Henderson et al. (2020), he discussed the challenges teachers, students, and parents face during school closures and the shift to remote learning due to the pandemic. The study provides practical strategies and insights for promoting collaboration, engagement, and effective mathematics learning in a virtual classroom environment. It emphasizes the importance of technology tools and resources for supporting mathematics learning and highlights the role of communication and flexibility in facilitating student learning during these uncertain times. The study also emphasizes the need for innovative teaching practices and instructional strategies to address the digital divide and other challenges students and teachers face during the pandemic. The study provides valuable recommendations and insights for supporting mathematics learning during the pandemic and beyond.

High achievers, distinguished by their grades in particular content areas, grade point averages, or achievement test scores, tend to use effective study strategies more frequently than low achievers (Sundre & Kitsantas, 2004). High-achieving college students, for example, used study strategies such as comparing class notes to their textbook, self-quizzing, and reading for understanding (Holschuh, 2000)

Conversely, low-achieving students focused on the order of materials that they needed to study (e.g., first study book or notes; Holschuh, 2000), used more rehearsal strategies than elaborative or organizational strategies (Kitsantas, 2002), and reported less effort regulation and help-seeking (VanZile-Tamsen & Livingston). Some low performers seemed to understand that they were using ineffective study strategies. For example, some low performers (Holschuh) recommended study strategies to friends that they admittedly did not use themselves (e.g., comparing textbook to class notes), and some low performers warned others against using their ineffective strategies (e.g., cramming).

High and low achievers also differed in their strategies in testing situations. Some test-taking methods used by high achievers are effective for increasing test performance. For example, Hermann (1996) reported that the frequency of markings, question marks next to items, or marking alternatives for option elimination on multiple-choice test booklets was linked to better performance on those tests. Strategies such as anticipating the answer to the questions before reading the other options, eliminating incorrect alternatives, skipping and later returning to difficult questions, and reviewing and revising responses to multiple-choice questions were reported by high achievers more often than by low achievers (Kim & Goetz, 1993)

It has been suggested that students who use test preparation and test-taking strategies will increase their academic success. For example, Samson (2001) gave high school and elementary school students a five-week training course on test-taking skills. Students trained on test-taking skills for five weeks or more had higher academic success. This result shows that education in test-taking skills positively affects the student's academic success. Smith (2002) studied the relationships between university students' perceptions of their test-taking skills, self-confidence, and test performance. Smith found a connection

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between the student's self-confidence and test performance, but there was no relationship between their perceptions of their test-taking skills and their test performance. Students' self-confidence has an essential role in their test performance, and having good test-taking strategies is not enough. From a psychological perspective, Dodeen (2008) asserts that using appropriate test-taking techniques reduces test anxiety.

Dolly and Williams (1986) indicate that response strategies may help students to transfer classroom learning to testing, and this can especially be helpful for students with low achievement levels to improve their academic performance. Some studies stress the importance of having test strategies to improve the performance of students with low achievement (e.g., Hughes & Schumaker, 1991a; Holzer, Madaus, Bray, & Kehle, 2009; Hughes, Ruhl & Peterson, 1988; Millman, Bishop & Ebel, 1965). Moreover, it was observed that students with high achievement levels prefer cognitive strategies in math tests more than students with low achievement levels (Kim & Goetz, 1993; Kitsantas, 2002).

E. RESEARCH DESIGN AND METHODOLOGY

Research Design. Descriptive–correlational was used to determine the relationship between and among variables.

F. MATERIALS/INFORMANTS

A survey questionnaire was used as a research instrument. The researchers adopted test-taking strategies and a test-preparation survey questionnaire by Bayron Bicak of Akdeniz University.

The subject of the study will be the first-year college students of the College of Education for the first semester, Academic Year 2021-2022, enrolled in the course Mathematics in the Modern World.

I. Data Analysis/ Procedure

Data were collected from the survey questionnaire. The data was analyzed using the Statistical Package for Social Sciences (SPSS).

G. RESULTS AND DISCUSSION

Test Preparation Strategies

Students' responses to the questions on the test preparation strategies were classified into three areas: cognitive, meta-cognitive, and social awareness. Table 1 presents categories and examples extracted from students' responses regarding test preparation strategies. One hundred twenty (53%) of 225 students said that they review at least one kind of material (chapter test, quizzes, practice problem from the book), eighty (36%) review from a homework assignment, use different study techniques and setting themselves goals while preparing for examination, twenty-five (11%) prepare for examination studying together with friends (Online).

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Table 1: Test Preparation Strategies

Variables	Frequency	Percentage
Cognitive	120	53%
Metacognitive	80	36%
Social	25	11%
Total	225	100%

Test Taking Strategies

Students' responses on test-taking strategies were classified into four: time management, item analysis, after-test, and distracter selection. Frequencies in the after-test approach were higher; 93 (41%) students said that they give reward themselves if they get a score that fits their target, 82 (37%) eliminated the questions which answers they do not know and made use of the clues in the questions while answering another one. Forty (18%) of the students arranged the time for each question before they started the test, and they did not spend extra time on queries.

Only 10 (4%) of the students read all options and chose the best one while answering questions, and they eliminated options that differed from the others.

Table 2: Test-Taking Strategies

Variables	Frequency	Percentage
Time Management	40	18%
Item Analysis	82	37%
After test	93	41%
Distracter Selection	10	4%
Total	225	100%

Test Preparation Strategies of high and low achievers

The high-achieving group used cognitive strategies, in general, more frequently than the low-achieving group (Mh =3.90, Ml= 3.71). High achieving manages their study environment more often than low achievers. Thus more high-achieving students accommodated their friends and sought assistance from teachers or capable others than did low achievers. Likewise, more high achievers articulated strategies (e.g., "If I have more time… if I have to understand the concept) than did low achievers.

Strategies	**High Achiever Mean**	**Low Achiever Mean**
Cognitive	3.90	3.71
Metacognitive	3.81	3.49
Social	3.80	3.63

Test Taking Strategies of high and low achievers

Students in the high-achieving group were more concerned about the structural organization in solving test problems than their low-achieving counterparts. More high achievers assessed item difficulties and repeated sequencing items before they solved problems than did low achievers. High achievers again reported using more distracter selection and time management for each item.

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Furthermore, high achievers checked the correctness of answers more often than their low-achieving counterparts.

Strategies	High Achiever Mean	Low Achiever Mean
Time Management	3.61	3.45
Item Analysis	3.89	3.55
Distracter Selection	3.87	3.68
After Test	3.82	3.66

There was a significant difference in the test-taking strategies of students when grouped according to the final grade. This showed that high-achieving students were highly interested in mathematics while those low achieving showed a low level of interest in mathematics. The study also revealed a correlation matrix in the relationship between the students' test preparation and test-taking strategies.

H. CONCLUSION AND RECOMMENDATION

The articulations of the college students in this study illustrate a glimpse of the evidence that some of these challenges are being considered in virtual classrooms. We also observed that many students did not engage in higher-order mathematical thinking. Instead, they focused on superficial reviewing, repeating, or checking facts and formulas without challenging themselves to understand and reason mathematically. Teaching and facilitating students to think and reason mathematically is a complex but essential challenge for teachers handling students during the pandemic. The challenge is even more difficult if mathematics instructors are unaware of their students' deficiencies in study strategies. Poor test preparation, test-taking skills, and anxiety negatively impact students' test performance and achievement. With the increased emphasis on educational accountability, pressure to raise test scores also has increased. The presented guidelines concerning appropriate and inappropriate instructional strategies for test preparation state that teaching test-taking skills is proper instruction for test preparation. The present study's findings support the need for instructional interventions for test-taking or study-skill enhancement to help students perform optimally in mathematics tests and other subject-matter areas. In addition, there was a significant difference in the test-taking strategies of students when grouped according to the final grade. This showed that high-achieving students were highly interested in mathematics while those low achieving showed a low level of interest in mathematics. The study also revealed a correlation matrix in the relationship between the students' test preparation and test-taking strategies. It was observed that attribution theory is closely associated with the concept of motivation, determining that a person’s attributions for success or failure ultimately affect the amount of effort they will exert on that activity in the future. Finally, these attributions predict future achievement behaviors.

Based on the conclusion of this study, several recommendations can be made. Firstly, mathematics instructors need to be aware of their students' deficiencies in study strategies and offer instructional interventions for test-taking or study-skill enhancement to help students perform optimally in mathematics tests and other subject-matter areas. The findings suggest that teaching and facilitating students to think and reason

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mathematically is a complex but essential challenge for teachers handling students during the pandemic. The challenge is even more difficult if mathematics instructors are unaware of their students' deficiencies in study strategies.

Furthermore, it is recommended that schools be flexibly organized so that all students, including low-achievers, can take a variety of individually-tailored mathematics programs that ultimately provide access to advanced mathematical learning. The study also highlights the importance of increasing awareness of non-cognitive factors important for performance in high-stakes test situations, which can lead to a more pleasant testing experience for the test-taker and more accurate test scores. Lastly, the study recommends that teachers use the cooperative instructional strategy to teach mathematics and other subjects in higher education to facilitate learning of higher levels of cognitive domains to meet the challenges of the twenty-first century and the challenges that the future may bring.

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