

# Examining the Mediating Effects of Resource Management Learning Strategies on the Relationship Between Test Anxiety and Academic Achievement of Grade 7 Learners in Science

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## ABSTRACT

This study examined the mediating effect of resource management learning strategies on the relationship between test anxiety and academic achievement in Science among Grade 7 learners in selected public secondary schools in Carmen District, Davao del Norte during School Year 2025–2026. Specifically, it determined the levels of test anxiety, resource management learning strategies, and academic achievement, as well as the relationships among these variables and the mediating role of resource management learning strategies. A quantitative descriptive-correlational design with mediation analysis was employed. The respondents were 233 Grade 7 learners selected through simple random sampling. Data were collected using adapted and validated questionnaires on test anxiety and resource management learning strategies, while academic achievement was measured using the Division Unified Test in Science. Mean, standard deviation, Pearson Product-Moment Correlation, and mediation analysis through the Medmod module of Jamovi were utilized. Results revealed that learners exhibited a high level of test anxiety ( $M = 3.40$ ,  $SD = 1.23$ ) and a high level of resource management learning strategies ( $M = 3.68$ ,  $SD = 1.11$ ). Academic achievement obtained a mean percentage score of 43.35, interpreted as Average. Significant positive relationships were found between test anxiety and resource management learning strategies ( $r = 0.535$ ,  $p < .001$ ), resource management learning strategies and academic achievement ( $r = 0.161$ ,  $p = .014$ ), and test anxiety and academic achievement ( $r = 0.150$ ,  $p = .022$ ). However, mediation analysis indicated that resource management learning strategies did not significantly mediate the relationship between test anxiety and academic achievement ( $a \times b = 1.317$ ,  $p = .184$ ). The findings suggest that improving Science achievement requires interventions that address both study habits and learners' emotional responses to assessments.

**Keywords:** Test Anxiety, Resource Management Learning Strategies, Academic Achievement, Mediation Analysis, Grade 7 learners

## INTRODUCTION

The Philippine basic education curriculum has undergone substantial reforms to create a more inclusive and effective learning environment. The MATATAG curriculum was progressively implemented, starting with Kindergarten and Grades 1, 4, and 7 in the 2024–2025 school year (Department of Education [DepEd], 2024). Subsequently, Grades 2, 3, 5, and 8 have transitioned to the MATATAG curriculum (DepEd, 2024). This curriculum redesign decongests prior K–12 programs, enhances foundational competencies in reading, mathematics, and science, and prioritizes learners' well-being (DepEd, 2023). Science education, in particular, emphasizes critical thinking, problem-solving, and the application of practical knowledge, which are central to the MATATAG curriculum (DepEd, 2023).

Despite these reforms, learners' academic achievement in Science continues to be influenced by multiple cognitive, instructional, emotional, and psychological factors, notably test anxiety. Test anxiety manifests as worry, tension, and physiological arousal during assessments, negatively affecting working memory, attention, and self-efficacy, ultimately undermining academic performance (von der Embse et al., 2018). Meta-analytic evidence indicates a moderate negative correlation between test anxiety and achievement, particularly in science and mathematics, where problem-solving demands are high (von der Embse et al., 2022). Furthermore, highly anxious learners are prone to avoidance-based behaviors such as procrastination, which limit effective preparation (Zhang & Debroy, 2023).

Filipino learners consistently underperform in science in both local and international assessments. The 2022 Program for International Student Assessment (PISA) ranked the Philippines third-lowest among 81 countries in science, with an average score of 356, far below the OECD average of 485 (Organization for Economic Co-operation and Development [OECD], 2023). Only 23% of Filipino learners reached competency level 2, compared to 76% in OECD countries (OECD, 2023). Similarly, the 2019 Trends in International Mathematics and Science Study (TIMSS) revealed low performance among Grade 4 Filipino learners, placing the country last among 58 participating nations (International Association for the Evaluation of Educational Achievement [IEA], 2020). Local assessments echo these findings; for instance, Grade 7 learners in Carmen District achieved an average MPS of 68.23% in science, with only 58.11% attaining at least 75% proficiency.

Research indicates that resource management learning strategies, including time management, environmental control, effort regulation, peer learning, and help-seeking, may buffer the negative impact of test anxiety on academic performance (Barrot et al., 2021; Trentepohl et al., 2023). Filipino learners who actively engage in structured study strategies demonstrate better self-regulated learning and higher science achievement (Baloran et al. 2021; Salcedo, 2022). However, the effectiveness of these strategies varies; high levels of strategy use do not automatically translate to higher achievement if applied ineffectively (Tria, 2020; Morales, 2021).

Focusing on Grade 7 learners is critical because this stage marks the transition from elementary to secondary education, introducing increased academic demands and more complex science content (DepEd, 2019). Coping mechanisms and learning habits established during this period may shape performance in subsequent grades. Furthermore, the Grade 7 curriculum emphasizes inquiry-based learning, which can amplify anxiety among learners who lack effective self-regulation.

Despite evidence of the importance of resource management learning strategies, there is a research gap regarding the mediating role of test anxiety on science achievement in Filipino Grade 7 learners. Most prior studies have examined direct relationships between test anxiety and achievement or have investigated strategies at higher education levels (Duong, 2020; Vaezi et al., 2018). Little is known about how resource management learning strategies might mitigate anxiety and enhance performance, specifically in junior high science contexts.

Given this gap, the present study investigates the relationship between test anxiety and academic achievement in Science among Grade 7 learners and examines whether resource management learning strategies mediate this relationship. Understanding these dynamics is urgent for designing targeted interventions that support learners' emotional well-being and improve science proficiency. By identifying effective strategies to manage anxiety and optimize study behaviors, educators can implement evidence-based programs to enhance both cognitive and affective outcomes in Science education.

## METHODOLOGY

### Research Design

This study employed a quantitative research method, which is characterized by the collection of measurable data and analysis of numerical data to determine the strength and direction of the variables (Creswell & Creswell, 2018), thus emphasizing objectivity and replicability, using statistical tools to test hypotheses and derive generalizable conclusions (Cohen et al., 2018). Quantitative data analysis pertains to numerical measurements and the statistical methodologies used to examine them. Results are typically presented using statistics,

mathematical techniques, tables, or graphs. Data collection varies depending on the method used, which may include online polls, questionnaires, surveys, interviews, etc. (Babbie, 2010).

The researcher utilized a descriptive-correlational design to determine the nature and extent of relationships between variables. According to Babbie (2010), descriptive research aims to describe situations and events through scientific observation and objective documentation of what is observed, as well as to examine the precise details of an item or entity to address inquiries about its condition or to validate hypotheses (Sahin & Mete, 2021). On the other hand, correlational research describes and measures the degree of association (or relationship) between two or more variables or sets of scores (Creswell & Creswell, 2018). According to Hall (2018) and Mohajan (2020), this design was beneficial for relating the variables under study by generating numerical data to quantify attitudes, opinions, behaviors, and other defined variables, and for generalizing results from a larger sample population. This research design was suitable for this study because it sought to assess test anxiety, resource management learning strategies, and academic achievement using numerical data collected.

Furthermore, a mediation analysis was utilized in this research to assess the mediating effect of resource management learning strategies in the relationship between test anxiety and academic achievement in science. Mediation analysis identifies how or why test anxiety, as an independent variable, influences academic achievement, as a dependent variable, through an intermediate variable, which is the resource management learning strategies; thereby providing a more profound understanding of an acknowledged association (Baron & Kenny, 1986; Hayes, 2022). In addition, Valente and MacKinnon (2015) said that it measures the causal chain in which a preceding variable leads to a mediating variable, which then influences a dependent variable.

In this context, the study investigated the relationship between test anxiety and academic achievement among Grade 7 learners in science. As they transition from elementary to secondary education, Grade 7 learners show interest in both academic and psychological research, driven by their unique learning characteristics. Specifically, the study investigates the intermediate variable of resource management learning strategies, which include indicators such as time and study environment, effort regulation, peer learning, and help seeking, to mediate the relationship between test anxiety and academic achievement.

### **Research Respondents**

The respondents of the study were Grade 7 learners enrolled in School Year 2025–2026 under the MATATAG Curriculum, also known as the Enhanced K–10 Curriculum. To ensure a representative sample and reduce bias, simple random sampling was employed, giving every member of the population an equal chance of selection. This sampling method is widely recognized for improving the generalizability and validity of quantitative research results (Creswell & Creswell, 2018).

The study was conducted in four schools in the Carmen District: School A, School B, School C, and School D. These schools are located in rural areas, and learners were organized in heterogeneous sections. The total population of Grade 7 learners in these schools was 593, while the sample size of 233 was determined using the Raosoft Sample Size Calculator (Raosoft Inc., 2004) with a 5% margin of error, a 95% confidence level, and an expected 50% response rate.

The lottery method was used to implement simple random sampling, which minimizes bias and ensures that all Grade 7 learners had an equal opportunity to be included in the study. This approach also enhances the representativeness of the sample, allowing the findings to be generalized to the broader population of Grade 7 learners in the Carmen District. Finally, the researcher assessed the feasibility of the study, considering factors such as costs, available resources, time constraints, and personnel requirements, to ensure that the research procedures could be effectively implemented.

### **Research Environment**

The study was conducted in four selected public secondary schools within the district of Carmen, Davao del Norte, Davao Region, Philippines. Carmen District is supervised by the Department of Education (DepEd) Division Office of Davao del Norte, located approximately 17 kilometers from the Division Office. The district has 22

public elementary schools and seven public secondary schools, serving learners from diverse backgrounds. These schools are supported by a dedicated teaching workforce and provide learner-centered educational practices. The selected schools were Alejal National High School, Anibongan National High School, Tubod National High School, and La Paz National High School.

### Research Instruments

This study employed two primary research instruments to examine the relationship between test anxiety, resource management learning strategies, and academic achievement in Science among Grade 7 learners. The instruments were adapted from validated scales, reviewed by professional validators for content clarity and relevance, and pilot-tested to ensure reliability and appropriateness for the respondents. Professional validation helped ensure that respondents understood the items and felt comfortable answering them.

The first instrument assessed test anxiety, including four dimensions: worry, cognitive interference, tension, and physiological indicators. It was adapted from the Multidimensional Test Anxiety Scale (Francis, 2022) and included 16 items modified for Grade 7 learners. Pilot testing indicated acceptable internal consistency for the subscales: worry ( $\alpha = .663$ ), cognitive interference ( $\alpha = .682$ ), tension ( $\alpha = .621$ ), and physiological indicators ( $\alpha = .501$ ). The overall reliability of the instrument was  $\alpha = .837$ , demonstrating a good level of internal consistency. This questionnaire measured learners' emotional, cognitive, and physiological responses when facing assessments.

The second instrument assessed resource management learning strategies, including time and study environment, effort regulation, peer learning, and help-seeking. It was adapted from the Motivated Strategies for Learning Questionnaire (MSLQ) by Pintrich et al. (1991) and included 19 items, with reversed items modified into positive statements. Pilot testing showed the following subscale reliability: time and study environment ( $\alpha = .544$ ), effort regulation ( $\alpha = .427$ ), peer learning ( $\alpha = .404$ ), and help-seeking ( $\alpha = .517$ ), with an overall reliability of  $\alpha = .745$ , indicating an acceptable level of consistency. This instrument measured learners' use of strategies to organize their time, regulate effort, structure their study environment, and seek support.

All items were rated on a 5-point Likert scale, where 5 = strongly agree, 4 = agree, 3 = neither agree nor disagree, 2 = disagree, and 1 = strongly disagree.

Academic achievement was operationalized as the learners' performance in Science using the Division Unified Test for the third quarter, a 40-item multiple-choice assessment covering Force, Energy, and Motion. The researcher also provided a Table of Specification (TOS) to determine the distribution of items and the competency in every item. The test's reliability was  $\alpha = .842$ , indicating a good level of internal consistency.

The test was given in a controlled situation, and each question was judged fairly. The overall raw score for each learner was converted to a percentage, with a minimum of 0. This scoring method makes it easier to compare and understand how well learners are doing. Also, after obtaining the individual percentage scores for each respondent, the Mean Percentage Score (MPS) was calculated by summing all the individual scores and dividing the total by the number of respondents. This process provided an objective measure of learners' overall science achievement, which served as the basis for determining their academic achievement. DepEd Memorandum No. 160, s. 2012, was used to interpret the results based on the mean percentage scores.

### Data Gathering Procedure

These needed procedures were followed by the researcher for this academic endeavor, which involves the following:

Seeking Permission to Conduct the Study. First, the researcher secured a letter of authorization to commence the study from the Dean of the Institute of Advanced Studies and the Program Chairperson of MST-Biology of the College. The above information was included in the letter to be submitted to the Schools Division Superintendent of the Davao del Norte Division for study approval. Finally, the school principals of the four participating schools

were informed of the research certification. They requested that the teachers at the participating schools assist in recruiting respondents by attaching this letter of authorization to carry out the study.

**General Orientation and Seeking Consent and Assent from Parents and Research Respondents.** Following the random selection, the respondents received a notification and were gathered for an orientation session in a designated room. Participants received a comprehensive presentation on the study during the session. The presentation included information on the survey, the study's benefits and objectives, and the researcher's objectives. The study was focused on RA 10173, also known as the Data Privacy Act of 2012. This legislation ensures the confidentiality of collected information and responses, limiting their use solely to information-gathering. Furthermore, in addition to the Confidentiality Agreement, the learners' Informed Consent and Assent, as well as parental consent, are required because all respondents are under 18 years of age. To protect the privacy of vulnerable participants, code numbers rather than names were used in all questionnaires and databases. All records were stored in password-protected files accessible only to the researcher and adviser.

**Crafting, Validating, and Administration of the Questionnaires.** The researcher administered a pilot test of all three instruments to 30 respondents coming from Mabuhay National High School in Carmen District. Therefore, the 30 respondents participating in the pilot test are not included in the main research sample. The researcher seeks authorization from the school head to conduct the pilot testing, oversee the distribution and collection of the survey questionnaires and tests, and compile the findings. Subsequently, the gathered data were meticulously tallied, tabulated, analyzed, and interpreted to determine whether the survey questionnaire met the necessary reliability standards. To be acceptable for internal consistency, the instrument should have a Cronbach's alpha of 0.070 or higher. The study was introduced to the respondents after the necessary documents were obtained, and the research tool and its purpose were explained. After the validity and reliability of the survey questionnaire and the researcher-adopted test were established, the respondents completed the survey questionnaires and took the test. Respondents were given ample time to complete the survey and to provide exact values or ratings from the available options. The research instruments were administered in the third quarter of the 2025-2026 school year. The researcher conducted an in-person interview using survey questions after obtaining informed consent, parental approval, and respondents' agreement.

Additionally, the researcher entertained clarificatory questions from the respondents regarding the statements in the questionnaire that they had read for translation and better understanding. The administration of the questionnaires and tests was conducted during a scheduled class period in coordination with the school administration and class advisers. Respondents were allotted approximately 30–45 minutes to complete the survey questionnaires and 45–60 minutes for the academic achievement test. To uphold justice, all respondents received a simple token of appreciation, such as school supplies or snacks.

**Retrieval, Checking, Collating, and Processing of Data.** Finally, upon retrieving the questionnaires, the researcher encoded all responses and their scores in a spreadsheet and submitted it to the statistician for statistical analysis. The results were analyzed and interpreted in accordance with the research objectives. Conclusions were drawn and recommendations formulated based on the study's findings.

## **Data Analysis**

The data gathered in this study was analyzed using several statistical tools to ensure a comprehensive and robust interpretation of the results. The research objectives and hypotheses guide the analyses to establish the relationships among test anxiety, resource management learning strategies, and the academic achievement of Grade 7 learners in science. The following statistical tools was employed:

**Mean.** The mean was computed to determine the average scores of the respondents in the key variables of the study: test anxiety, resource management learning strategies, and academic achievement in science. These measures established a general profile of the learners and allowed the researcher to interpret the central tendency of each variable.

**Standard Deviation.** The standard deviation described the extent of variability around the mean, indicating how consistent or diverse the learners were in their anxiety levels, academic achievement, and strategy use. A smaller standard deviation suggested greater consistency among learners, whereas a larger standard deviation indicated greater variability.

**Pearson Product-Moment Correlation.** The Pearson correlation coefficient ( $r$ ) was applied to examine the strength and direction of the linear relationships among test anxiety (independent variable), science achievement (dependent variable), and resource management learning strategies (mediating variable). Pearson  $r$  values provided the empirical basis for establishing the presence of significant associations prior to mediation analysis.

**Mediation Analysis.** To formally establish the extent to which the association between an independent variable and a dependent variable is mediated by a third variable, known as the mediator (Baron & Kenny, 1986). In this research, this statistical measure was employed to establish the extent to which resource management learning strategies can be used as a mediator variable in the association between test anxiety and academic achievement among Grade 7 learners in Science. The confidence intervals for the indirect effects are likely to be calculated using bootstrapping techniques in the study, which does not assume a normal distribution for the impact (Preacher & Hayes, 2004; Hayes, 2021). It provided insights on the direct and indirect associations between variables, and this was applied to answer research question 5. The analysis of the mediation was conducted through regression processes on the Medmod module of Jamovi, which is a free statistical software package that quantifies quality and reliability of results.

## **Ethical Considerations**

This study focused on Grade 7 learners and prioritized ethical standards throughout the research process. The researcher adhered to the principles outlined in the Belmont Report (1979), including respect for persons, beneficence, and justice, to ensure the protection, safety, and trust of all respondents.

**Respect for Persons.** All respondents were treated with respect, and their autonomy was protected. Their personal information remained confidential throughout the study, and participation was voluntary.

**Consent and Assent.** Parental consent and learner assent were obtained before administering questionnaires and tests. Participants were informed about the purpose of the study, the procedures involved, and their rights, including the option to withdraw at any time without consequences.

**Confidentiality.** All responses were coded to maintain confidentiality, and only the researcher had access to the raw data. Data were used solely for research purposes, and no identifying information was disclosed in the reporting of results.

**Voluntary Participation.** Participation was completely voluntary. Participants were advised that they could skip any question or refrain from responding if they felt uncomfortable. No coercion was applied, and learners were not penalized for non-participation.

**Pilot Testing and Administration.** A pilot test was conducted to ensure the reliability and clarity of the instruments. After validation, the questionnaires and Division Unified Test were administered in a controlled environment. The researcher provided clarifications when necessary to ensure that all participants understood the items.

**Risk and Benefit.** No physical or psychological risks were posed to the respondents. The study's findings were expected to benefit school administrators, teachers, and learners by providing insights into test anxiety, learning strategies for resource management, and academic achievement. Participants were acknowledged with small tokens of appreciation for their cooperation.

**Institutional Approval.** Ethical approval was obtained from the college Ethics Review Committee, and permission was secured from school principals and class advisers before conducting the study. All procedures

followed the ethical guidelines set by the Davao del Norte State College Institute of Advanced Studies and the graduate school.

**Academic Integrity.** The researcher ensured that all sources were properly cited to avoid plagiarism. Data collection and reporting were conducted honestly, without fabrication or falsification.

**Authorship.** The study was conducted by a Bachelor of Secondary Education major in Biological Sciences graduate under the supervision of Dr. Sabar G. Hasan, EdD. The research was revised in accordance with the adviser's recommendations and complied with the college's ethical standards throughout the study.

## RESULTS AND DISCUSSIONS

### Level of Test Anxiety among Grade 7 Learners

Table 1 shows the level of test anxiety among Grade 7 learners. The indicator 'worry' has the highest mean of 3.64, with a descriptive equivalent of 'high'. It is followed by tension (mean = 3.51) and cognitive interference (mean = 3.48), both with descriptive equivalents of high. On the other hand, physiological indicators have the lowest mean of 2.96, which falls within the moderate descriptive equivalent. This implies that the learners experience all the indicators under test anxiety.

Table 1. Level of Test Anxiety among Grade 7 Learners

| Indicators               | Category Mean | SD   | Descriptive Equivalent |
|--------------------------|---------------|------|------------------------|
| Worry                    | 3.64          | 1.14 | High                   |
| Cognitive Interference   | 3.48          | 1.14 | High                   |
| Tension                  | 3.51          | 1.20 | High                   |
| Physiological Indicators | 2.96          | 1.33 | Moderate               |
| Overall Mean             | 3.40          | 1.23 | High                   |

Furthermore, the summary indicates that learners report an overall high level of test anxiety with a mean of 3.40 and a standard deviation of 1.23, suggesting that learners experience test anxiety through psychological symptoms such as worry, cognitive interference, and tension, while physical symptoms are less pronounced. This implies that the learner's test anxiety manifests more as cognitive and emotional stress rather than physiological arousal.

The multidimensional framework of test anxiety, which suggests that anxiety is a combination of the cognitive (worry and cognitive interference) and affective-physiological (tension and bodily reactions) components, is consistent with this data (Putwain et al., 2020). Additionally, Putwain et al. (2018) found that test anxiety demonstrated by learners in this pattern appears to present largely through internal psychological processes, particularly anxiety and intrusive thoughts, as opposed to noticeable bodily reactions. The high level of worry and cognitive interference indicates that learners are largely affected by mental distractions and attentional traps during tests, which may impair knowledge retrieval and overall test performance (Rachman et al., 2022). On the other hand, the moderate level of physiological symptoms indicates that learners do have bodily responses, such as increased heart rate and muscle tension, but these are less common than the mental-emotional responses (Hembree, 2017; Schillinger et al., 2021). Moreover, multiple empirical studies report that the cognitive component of anxiety, and more specifically worry, is the most impactful on negative academic performance because it occupies valuable working memory needed for reasoning and processing (Roos et al., 2020; Burcaş and Creţu, 2020). Distraction caused by self-doubt and intrusive thoughts has also been shown to lower concentration, test performance, and academic performance.

In the Philippine educational system, similar findings have been reported among junior high school learners. Rogayan (2019) noted that Filipino learners most often suffer from increased anxiety when it comes to testing in the sciences. There is an increased likelihood of unproductive behaviors, including the worry and fear of

failure, which drastically diminishes their outcomes. Similarly, Almonia (2024) reported that learners enrolled in public institutions experience and manifest exam-related anxiety, including stress, expectation of top performance, and a lack of coping mechanisms. Filipino learners' correlating cognitive-emotional experiences, as multiple studies have shown, is clear proof that test anxiety is highly prevalent and should not be classified as a secondary phenomenon.

However, it is worth noting that test anxiety may not always lead to negative outcomes. Several researchers have suggested that anxiety should not always be considered a negative trait. Moderate levels of anxiety can be seen as positive, as they increase alertness, motivation, and effort during testing (Zeidner, 2014). Lowe (2018) has shown that anxiety may be constructive, in that it results in learners' greater persistence and effort in studying and exam preparation. Several such studies argue the complexity of test anxiety and performance in relation to such factors as coping mechanisms, self-efficacy, and perceived control.

### Level of Academic Achievement in Science Among Grade 7 Learners

Table 2 presents the level of learner's academic achievement in science based on their Mean Percentage Score. The data revealed the mean score of 43.35, which falls under the quantitative description of "Average". This indicates that learners demonstrate a moderate level of science achievement, suggesting partial understanding of concepts but still requiring further development toward mastery.

Table 2. Level of Academic Achievement in Science Among Grade 7 Learners

| Variable                        | Parameter                     | N   | %   | Mean Percentage Score | SD    | Descriptive Equivalent |
|---------------------------------|-------------------------------|-----|-----|-----------------------|-------|------------------------|
| Academic Achievement in Science | Mastered                      | 0   | 0   | 43.35                 | 14.85 | Average                |
|                                 | Closely Approximating Mastery | 0   | 0   |                       |       |                        |
|                                 | Moving Towards Mastery        | 16  | 7%  |                       |       |                        |
|                                 | Average                       | 137 | 59% |                       |       |                        |
|                                 | Low                           | 77  | 33% |                       |       |                        |
|                                 | Very Low                      | 3   | 1%  |                       |       |                        |
|                                 | Absolutely No Mastery         | 0   | 0   |                       |       |                        |

The standard deviation of 14.85 indicates wide variability in achievement. This indicates substantial variability in learners' performance, suggesting the presence of both low- and relatively high-performing groups within the sample. These findings point to a potential difference in learning strategies and other factors associated with for learners to attain high science achievement.

Literature indicates that learners exhibit an average level of academic achievement in Science, as reported by various local studies. For example, an action research project involving junior high school science learners in Central Luzon found that prior to a targeted intervention, learners performed below average in science achievement but displayed slightly positive attitudes toward biology; post-intervention improvements underscored the potential for raising achievement levels through differentiated learning strategies such as the Biology Learning Station Strategy (BLISS) (Rogayan, 2019). Similarly, studies on public elementary pupils reveal that collaborative learning methods significantly enhance science achievement as compared to individualized approaches, suggesting systemic factors in pedagogy contribute to the current performance plateau (Almonia, 2024).

### Level of Resource Management Learning Strategies of Grade 7 Learners

Table 3.5 presents a summary of the level of resource management learning strategies among Grade 7 learners. Help-seeking obtained the highest mean score of 3.78 (SD=1.09), indicating high levels of help-seeking and

suggesting that learners are proactive in seeking assistance from teachers, peers, or other resources when they encounter difficulties. This is closely followed by time and study environment ( $M=3.72$ ) and peer learning ( $M=3.71$ ), both with a standard deviation of 1.08, and both are described as high. This signifies that learners exhibit a high level of ability in managing their time effectively and in creating an appropriate study environment conducive to learning and active engagement in collaborative learning or study groups, thereby enhancing understanding through interaction with classmates, leading to improved learning outcomes.

**Table 3. Level of Resource Management Learning Strategies of Grade 7 Learners**

| Indicators                 | Category Mean | SD   | Descriptive Equivalent |
|----------------------------|---------------|------|------------------------|
| Time and Study Environment | 3.72          | 1.08 | High                   |
| Effort Regulation          | 3.48          | 1.19 | High                   |
| Peer Learning              | 3.71          | 1.08 | High                   |
| Help Seeking               | 3.78          | 1.09 | High                   |
| Overall Mean               | 3.68          | 1.11 | High                   |

However, effort regulation received the lowest mean score among the indicators, at 3.48 ( $SD=1.19$ ), which was described as high. This slightly lower mean score compared to other dimensions suggests occasional difficulty maintaining sustained effort during demanding tasks and a tendency to persist less and be more easily distracted in achieving academic goals. However, this reflects their perseverance and ability to maintain focus despite potential distractions or difficulties. The overall mean score across all dimensions was 3.68, indicating a generally high level of resource management learning strategies, often exhibited by Grade 7 learners.

As reflected in the findings, Grade 7 learners employ high levels of resource management learning strategies, which are crucial for successful self-regulated learning and indicative of learners' readiness for autonomous and self-directed learning among younger learners transitioning to more independent learning (Edelbring & Wahlström, 2016). Also, learners' resource management skills, alongside metacognitive knowledge and motivational beliefs, can contribute to improved academic achievement and lifelong learning capacity (Nabizadeh et al., 2019; Paethrangsi et al., 2024).

Results are consistent with studies in the Philippine Junior High School context. Baloran et al. (2021) noted that Filipino learners who are help seekers achieve better academic outcomes due to support from teachers and peers. Likewise, Laguador (2014) and Acosta and De Guzman (2025) pointed out that, for Filipino learners, cooperative learning and peer teaching do help improve learning in Science subjects.

Moreover, Salcedo (2022) noted that Filipino adolescents' school success is determined by their ability to manage their time and maintain a consistent study routine. This is particularly true for public school adolescents who are overwhelmed by academic demands with minimal supervision to study at home. This confirms the current study's finding that time management and study environment management are the stronger skills of Grade 7 learners.

Local studies have shown contrasting results as well. Tria (2020) noted that, contrary to his study's findings, Filipino learners reported high levels of study management. He found that digital technology, home chores, and unorganized study situations at home disrupted study management. Similarly, Morales (2021) noted that the main reasons for learners' poor academic performance are a lack of consistent motivation and poor study methods.

Findings are supported by Self-Regulated Learning (SRL) theory, specifically the performance phase, in which learners apply strategies for time management, control of the study environment, effort regulation, and other strategies to complete academic tasks (Schunk, 2023). In this phase, learners apply the strategies they deliberately planned, as evidenced by the high level of resource management they employ.

In this regard, Zimmerman's SRL model indicates that learners who manage their study environment and even request assistance when necessary are most likely to succeed in their academic endeavors. In the same vein,

Edelbring and Wahlström (2016) observe that junior high learners are in a phase of transition as they initiate self-directed learning, underscoring the significance of resource management.

Doo and Zhu (2024) contend, however, that motivation alone may not be sufficient to support effective strategizing, particularly when learners demonstrate a lack of consistency or support, which could account for the low effort regulation score in this study.

### Significance of the Relationship between the Variables

Table 4 presents the relationship between the following variables: test anxiety and resource management learning strategies, resource management learning strategies and academic achievement of Grade 7 learners in Science, and test anxiety and academic achievement of Grade 7 learners in Science.

Table 4. *Significance of the Relationship between Test anxiety, Resource Management Learning Strategies and Academic Achievement*

| Variables Correlated                                             | r     | p-value | Decision on H <sub>0</sub> | Decision on Relationship |
|------------------------------------------------------------------|-------|---------|----------------------------|--------------------------|
| Test anxiety and Resource Management Learning Strategies         | 0.535 | 0.000   | Rejected                   | Significant              |
| Resource Management Learning Strategies and Academic Achievement | 0.161 | 0.014   | Rejected                   | Significant              |
| Test anxiety and Academic Achievement                            | 0.150 | 0.022   | Rejected                   | Significant              |

Firstly, in the relationship between test anxiety and resource management learning strategies of Grade 7 learners, the results indicate a moderate positive relationship between the two variables ( $r = 0.535$ ), with a p-value of  $0.000 < 0.05$ , confirming statistical significance, suggesting that the variables exhibit a noticeable tendency to increase together with a reasonably consistent relationship. This means that learners who experience higher levels of test anxiety tend to employ resource management learning strategies more frequently. This suggests that anxious learners may attempt to cope with their anxiety by organizing their study time, managing their learning environment, and utilizing available academic resources more effectively. Consequently, the null hypothesis ( $H_0$ ), which states that there is no significant relationship between test anxiety and resource management learning strategies, is rejected.

Secondly, in the relationship between resource management learning strategies and the academic achievement of Grade 7 learners in Science, the results show that resource management learning strategies correlate with academic achievement in Science. According to the table, the r-value is 0.161, indicating a very weak positive correlation: the variables exhibit a slight but statistically significant tendency to increase together, though the relationship is minimal. At the same time, the p-value is  $0.014 < 0.05$ , confirming that the correlation is statistically significant. Given these results, the null hypothesis ( $H_0$ ), which states that there is no significant relationship between resource management learning strategies and academic achievement in Science, is rejected.

Lastly, the relationship between test anxiety and academic achievement of Grade 7 learners in Science, the result shows that the r-value of 0.150 indicates a very weak positive correlation. This suggests that the variables, test anxiety and science achievement, are related, but the relationship is neither as strong nor as consistent. At the same time, the p-value is  $0.022 < 0.05$ , confirming that the correlation is statistically significant. Predictions based on this relationship are limited and should be interpreted with caution due to the very weak effect size. The positive direction implies that a certain level of anxiety may be beneficial; however, its overall association remains minimal compared to other factors affecting academic achievement. Moreover, it implies that learners' higher levels of test anxiety are associated with slightly higher academic achievement, but the effect is minimal and not a strong predictor of science achievement. The rejection of the null hypothesis ( $H_0$ ) confirms that the relationship between these variables is statistically significant.

Several studies confirm the important connections among test anxiety, resource management learning strategies, and academic achievement. Some researchers describe test anxiety as beneficial at moderate levels. This means that an increase in test anxiety is associated with greater effort and engagement in learning and studying more efficiently, as well as increased academic achievement (Heckel et al., 2021; Tan & Pang, 2023). On the other hand, other researchers state that the most severe test anxiety is counterproductive to learning strategies. This is caused by excessive worrying, daydreaming, or being unable to learn (Roos et al., 2020). Researchers state that there is more than these two extremes. This combined means that the anxiety and academic performance relationship is more complex than anxiety and learning ability.

The findings indicate that learners who are anxious and worried should still engage in learning. Because of their anxiety, learners may employ learning strategies, such as peer study groups, time management, or learning management. Teachers may notice anxious learners working hard, studying, or being more organized. Indeed, learners worked hard, but their test anxiety may have affected their cognitive abilities and performance. This means that learners are using good study habits and learning strategies, but more needs to be done to lessen their anxiety. Teachers should want to adopt new learning strategies but should also include study strategies to reduce anxiety. Teachers should adopt new learning strategies and study techniques to reduce anxiety.

### Mediating Effect of Resource Management Learning Strategies on the Relationship Between Test Anxiety and Academic Achievement in Science among Grade 7 Learners

The assumptions underlying the mediation analysis were carefully examined before conducting the analysis. First, the descriptive statistics showed that test anxiety, resource management learning strategies, and academic achievement all exhibited sufficient variability, as evidenced by their respective means and standard deviations. This indicates that the data were appropriate for further analysis. Second, preliminary correlations suggested linear associations; however, linearity is assumed rather than fully tested. These correlations indicate that the relationships among variables are linear and suitable for mediation analysis. To address the assumption of normality, the study employed bias-corrected bootstrap confidence intervals, which are robust even when the data are nonnormal. Overall, the statistical assumptions regarding variability, linearity, and estimation procedures were satisfied; however, the indirect effect was not statistically significant. Furthermore, the significant relationships among variables support the necessary preconditions for mediation analysis, indicating that the data are appropriate for testing the mediating effect of resource management learning strategies on the relationship between test anxiety and academic achievement in Science among Grade 7 learners.

Table 5.1 presents the mediation analysis examining whether resource management learning strategies mediate the relationship between test anxiety and academic achievement in Science among Grade 7 learners. It was hypothesized that resource management learning strategies would mediate this relationship.

Table 5.1 Mediation Estimates of Resource Management Learning Strategies on the Relationship Between Test Anxiety and Academic Achievement in Science among Grade 7 Learners

| Indirect and Total Effects |                                                                                                       |          |        |              |       |         |      |       |  |
|----------------------------|-------------------------------------------------------------------------------------------------------|----------|--------|--------------|-------|---------|------|-------|--|
|                            |                                                                                                       |          |        | 95% C.I. (a) |       |         |      |       |  |
| Type                       | Effect                                                                                                | Estimate | SE     | Lower        | Upper | $\beta$ | z    | p     |  |
| Indirect                   | Test Anxiety $\Rightarrow$ Resource Management Learning Strategies $\Rightarrow$ Academic Achievement | 1.317    | 0.9908 | -0.540       | 3.368 | 0.0549  | 1.33 | 0.184 |  |
| Direct                     | Test Anxiety $\Rightarrow$ Academic Achievement                                                       | 2.288    | 1.8346 | -1.497       | 6.035 | 0.0954  | 1.25 | 0.212 |  |
| Total                      | Test Anxiety $\Rightarrow$ Academic Achievement                                                       | 3.605    | 1.5595 | 0.352        | 6.876 | 0.1504  | 2.31 | 0.021 |  |

First, the result showed an estimated indirect effect (a x b) of 1.317 with a standard error (SE) of 0.9908. The 95% confidence interval (CI) ranged from -0.540 to 3.368, and the standardized beta ( $\beta$ ) was 0.0549, with a z-

value of 1.33 and  $p = 0.184$ . Since the confidence interval includes zero and the  $p$ -value is greater than .05, this indirect effect is not statistically significant. This suggests that while test anxiety may be associated with resource management learning strategies, which in turn might affect academic achievement, the evidence does not robustly confirm a significant mediation in this sample.

Meanwhile, the direct effect of test anxiety and academic achievement in Science among Grade 7 learners was estimated at 2.288 (SE = 1.8346), with a 95% CI of [-1.497, 6.035],  $\beta = 0.0954$ ,  $z = 1.25$ , and  $p = 0.212$ . This direct effect is also not statistically significant, implying no clear direct association between test anxiety and academic achievement independent of resource management learning strategies.

Furthermore, the total effect of test anxiety on academic achievement was statistically significant but weakly positive ( $c = 3.605$ ,  $\beta = 0.1504$ ,  $p = 0.021$ ), suggesting that increases in test anxiety are associated with slight increases in academic achievement. Neither the indirect nor the direct effects through resource management learning strategies were statistically significant. This indicates that overall test anxiety is significantly associated with academic achievement in science among Grade 7 learners. However, the pathway involving resource management learning strategies as a mediator is not statistically significant.

Given that the total effect of test anxiety on academic achievement is statistically significant ( $c = 3.605$ ,  $p = 0.021$ ), while both the direct effect ( $c' = 2.288$ ,  $p = 0.212$ ) and the indirect effect ( $a \times b = 1.317$ ,  $p = 0.184$ ) are not statistically significant, this indicates that the overall association of test anxiety is not explained by either the direct pathway or the mediated pathway through resource management learning strategies. Furthermore, the indirect effect is not significant, which further supports the absence of mediation. Thus, the null hypothesis ( $H_0$ ), which states that resource management learning strategies do not significantly mediate the relationship between test anxiety and the academic achievement of Grade 7 learners in Science, is not rejected. Finding a fully mediated effect of learning strategies with emotional variables like anxiety when it comes to academic achievement in the context of the Philippines is similar to other educational systems. Studies show that Filipino learners use self-regulated learning strategies primarily in limited contexts. These strategies are often not enough to reverse the impact of anxiety, especially when other factors like cognitive interference and emotions come into play (Nabizadeh et al., 2019; Paethrangsi et al., 2024). The behavioral and emotional complexity that affects academic achievement is evident in this case. In classroom practice, the absence of a mediating effect shows that academic achievement, in this case, the absence of anxiety, is not improved just by teaching resource management strategies. Even organized learners can experience learning underperformance due to test anxiety. Learning strategies, along with emotional support such as stress management training, confidence-building activities, and supportive feedback, are needed to make a difference. Addressing anxiety-related emotional issues coupled with cognitive elements can help learners achieve academic goals.

Overall, the absence of a mediating effect indicates that the assumed mechanism, in which test anxiety influences academic achievement through resource management learning strategies, was not supported in the specific context of this study. This highlights the context-dependent nature of educational relationships, suggesting that theoretical models may operate differently depending on learners' characteristics, classroom environments, and developmental stages. In the case of Grade 7 learners, they may be influenced more by other factors not included in the model.

### Component Path Estimates of Test Anxiety, Resource Management Learning Strategies and Academic Achievement in Science among Grade 7 Learners

**Table 5. 2 Component Path Estimates of Test Anxiety, Resource Management Learning Strategies and Academic Achievement in Science among Grade 7 Learners**

| Component Paths |              |          |        |              |       |         |      |       |
|-----------------|--------------|----------|--------|--------------|-------|---------|------|-------|
|                 |              |          |        | 95% C.I. (a) |       |         |      |       |
| Type            | Effect       | Estimate | SE     | Lower        | Upper | $\beta$ | z    | p     |
|                 | Test Anxiety | 0.457    | 0.0474 | 0.354        | 0.561 | 0.5349  | 9.64 | <.001 |

|           |                                                                |       |        |        |       |        |      |       |
|-----------|----------------------------------------------------------------|-------|--------|--------|-------|--------|------|-------|
| Component | ⇒ Resource Management Learning Strategies                      |       |        |        |       |        |      |       |
|           | Resource Management Learning Strategies ⇒ Academic Achievement | 2.881 | 2.1464 | -1.279 | 7.049 | 0.1027 | 1.34 | 0.179 |
|           | Test Anxiety ⇒ Academic Achievement                            | 2.288 | 1.8346 | -1.497 | 6.035 | 0.0954 | 1.25 | 0.212 |

Effect (Test Anxiety → Resource Management Learning Strategies): The estimate of this path is 0.457 with a standard error of 0.0474, and the standardized coefficient ( $\beta$ ) is 0.5349, with a highly significant z-value of 9.64 ( $p < .001$ ). This indicates a strong, positive, and highly significant direct effect of test anxiety that strongly predicts resource management learning strategies. This suggests that Grade 7 learners with higher test anxiety tend to associate with greater engagement in more resource management strategies.

Effect (Resource Management Learning Strategies→Academic Achievement): The estimate in this path is 2.881(SE = 2.1464), with a wide 95% confidence interval spanning from -1.279 to 7.049. The standardized coefficient is relatively small ( $\beta = 0.1027$ ), and the z-value (1.34) is not statistically significant ( $p = 0.179$ ). This suggests that, in this dataset, resource management learning strategies do not significantly predict academic achievement in science. Because this link is weak, the mediation effect does not hold.

Effect (Test Anxiety→Academic Achievement): The direct path's estimate is 2.288 (SE = 1.8346), with a wide confidence interval (-1.497 to 6.035) and a small standardized coefficient ( $\beta = 0.0954$ ). The z-value of 1.25 is not statistically significant ( $p = 0.212$ ). Thus, test anxiety does not have a statistically significant direct effect on academic achievement when resource management learning strategies (mediator) are considered.

The statistically significant relationship between test anxiety and resource management learning strategies ( $\beta = 0.05349$ ,  $p = <.001$ ) is supported by research in the Philippines. Baloran (2021) found that, under increased academic pressure, Filipino junior high school learners increased both help-seeking and studying, which became coping mechanisms. Likewise, Salcedo (2022) suggested that academic anxiety among Filipino youth often triggers positive behavioral changes, such as increased studying and preparation, with the most notable changes occurring in Science, where the performance tasks are high.

Nevertheless, the lack of a statistically significant relationship between resource management learning strategies and academic achievement ( $\beta = 0.1027$ ,  $p = 0.179$ ) indicates that simply using a strategy does not guarantee better achievement in Science. Thus, it is the misuse of study strategies that leads to average performance. Learners may study for long hours, ask questions, and even help each other. Still, performance may remain average due to ineffective study strategies, such as cramming, a lack of questions that target understanding scientific concepts, or dead-end discussions.

The statement in Tria (2020) supports the idea that Filipino learners tend to claim they study a lot but fail academically because of poor study quality, lack of focus, and poor planning. Morales (2021) reiterated that the learning strategy used and its effectiveness are not solely determined by the frequency of its use, but rather by the extent and precision of its application.

The direct impact of test anxiety on academic achievement is not statistically significant ( $\beta = 0.0954$ ,  $p = 0.212$ ). This means that test anxiety, by itself, does not affect Science performance when resource management learning strategies are taken into account. This means that in the classroom context, despite test anxiety, some learners

perform the same way as others. This is especially true when grading, assessment, and teacher support create a structure that alleviates emotional stress.

Admittedly, in this regard, the findings are at odds with the majority of local and international literature. For example, Putwain et al. (2022) reported that test anxiety is typically associated with academic underperformance and is attributable to cognitive interference. As Steinmayr et al. (2016) showed, worry is detrimental to academic performance and is caused by a constriction in the availability of attention and working memory.

Conversely, some literature has adopted a more positive or neutral valuation of anxiety. A case in point, Cassady and Johnson (2022) posited that worry in small amounts can be constructive because it fosters motivation. More in tune with this line of argument, Tan and Pang (2023) demonstrated that worry can have a positive impact on academic effort and persistence.

Since the direct and indirect effects are not statistically significant, resource management learning strategies do not mediate the relationship between test anxiety and academic achievement. These findings agree with the mediation framework, particularly that of Baron and Kenny (1986). They said that when indirect effects are not present, mediation is not established. Lack of mediation implies that test anxiety affects academic achievement through some channels not delineated in this model. These channels could include emotional, motivational, cognitive coping, or other non-resource-management mechanisms.

These findings have important educational implications. Although the mediation is absent, the relationship among the variables is overall significant. This suggests that other mediators, such as motivation and coping strategies, may explain how test anxiety affects achievement. The findings suggest that educators should continue to emphasize the development of resource management learning strategies among learners. Teaching learners how to manage their time, regulate effort, and seek help effectively can directly enhance academic performance in science. At the same time, while reducing test anxiety remains important, it may not be necessary to rely on anxiety reduction as the primary pathway for improving academic achievement. Instead, interventions can focus more on strengthening study habits and learning behaviors in shaping learners' achievement.

## CONCLUSION

This study explored the relationships among test anxiety, resource management learning strategies, and academic achievement in science, examining how test anxiety affects resource management learning strategies, how resource management learning strategies predict science achievement, and whether test anxiety mediates the link between test anxiety and science achievement. The findings highlight how these variables are collectively associated with Grade 7 learners' achievement in Science.

The first hypothesis discloses a significant relationship between test anxiety and resource management learning strategies at the 0.05 alpha level. The results support this hypothesis, with an estimated correlation of 0.535 ( $p=0.000$ ), indicating a moderate, positive, and statistically significant association between the two variables. This finding suggests that learners who exhibit higher levels of test anxiety are more likely to employ resource management learning strategies frequently.

Moreover, the second hypothesis asserts a significant relationship between resource management learning strategies and academic achievement in Science at the 0.05 alpha level. The results support this hypothesis, with an estimated coefficient of 0.161 ( $p = 0.014$ ), indicating a very weak, but statistically significant, positive relationship between the variables. This suggests that learners who utilize resource management learning strategies may experience slight improvements in their science achievement. Although the effect is statistically significant, its small magnitude suggests that these strategies alone are insufficient to produce substantial gains in achievement.

The third hypothesis indicates a significant relationship between test anxiety and academic achievement of Grade 7 learners in Science at the 0.05 alpha level. The results support this hypothesis, with an estimated coefficient of 0.150 ( $p = 0.022$ ), indicating a very weak, but statistically significant, positive relationship between the variables.

This suggests that learners who experience higher levels of test anxiety are slightly associated with higher science achievement, the effect of test anxiety is minimal, and not a strong predictor.

The mediation analysis does not provide further support for rejecting the fourth hypothesis. The non-significant indirect effect of test anxiety on academic achievement in science through resource management learning strategies ( $a \times b = 1.317$ ,  $p = 0.184$ ), indicating that resource management learning strategies do not mediate the relationship between test anxiety and academic achievement. The non-significant direct effect ( $c = 2.288$ ,  $p = 0.212$ ) suggests that test anxiety does not directly predict academic achievement after controlling resource management learning strategies.

The study revealed that Grade 7 learners' average science achievement reflects moderate understanding, alongside high levels of test anxiety, which are significantly associated with the use of adaptive resource management learning strategies. However, resource management strategies do not significantly mediate the relationship between test anxiety and academic achievement, indicating that anxiety influences performance more directly. These findings partially support Test Anxiety Theory and Self-Regulated Learning Theory, suggesting that while anxiety prompts strategy use, it is not sufficient to explain or buffer its impact on science achievement. This implies that while test anxiety significantly influenced learners' use of self-regulatory learning strategies, such as time management and study environment, effort regulation, peer learning, and help-seeking, these strategies were not effective enough to translate into improved achievement in Science.

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