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Time Management And Self-Directed Learning As Predictors Of Academic Performance Of Students In Mathematics

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Abstract
Purpose: This study determined the influence of time management and self-directed learning on the academic performance of students in Mathematics.
Methodology: A quantitative research design utilizing descriptive and correlational approaches was employed. 152 Grade 9 respondents were chosen from private schools in Davao City.
Results: The findings indicated that time management is manifested most of the time and self-directed learning is much observed. Moreover, the academic performance in Mathematics is not proficient. Further, time management and self-directed learning were found to have no significant relationship with academic performance in Mathematics. Thus, time management and self-directed learning do not significantly predict academic performance in Mathematics.
Limitations: This study only highlighted 152 students and 4 private schools that were offering blended learning modality.
Contribution: The results and findings of this study can be used as a basis for creating interventions and programs to address problems in academic performance in Mathematics.
Novelty: Most previous studies were conducted in a face-to-face learning modality; however, this study is contextualized in the blending learning modality.
Keywords: *time management, self-directed learning, academic performance, Mathematics*
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1. Introduction

The good academic performance brings a lot of significant advantages and opportunities to academic life. Academic performance is one of the indicators of success in life; it reflects one's ability and the qualities it takes to have academic excellence in life (Igere, 2017). Therefore, students should do well at school to become academically successful (Maqbool, 2019). However, numerous studies show that several countries have poor student academic performance, particularly in Mathematics (OECD, 2019).

Internationally, Indonesia was ranked 64th out of 65 countries, with a poor performance in Mathematics. The study also mentioned that several TIMMS-audited countries, such as Indonesia, exhibited no improvement in academic performance in the field of Mathematics (Ajisuksmo & Saputri, 2017; Guinocor et al., 2020). Furthermore, according to the Programme for International Student Examination (PISA) international assessment, ASEAN countries scored lower than in the previous assessment in 2018. The following are the ranks of the participating countries, led by Singapore, Vietnam, Brunei Darussalam, Thailand, Indonesia, and the Philippines as the lowest (OECD, 2019).

Meanwhile, in the Philippines, the Department of Education said that the performance of the Philippines in large-scale assessments like the National Achievement Test (NAT) has dropped to low proficiency levels, specifically in Mathematics (Gonzales, 2019). The same results were consistent as the Philippines ranked second to last in the most recent Programme for International Student Assessment 2018 (OECD, 2019).

Furthermore, in 2019, the Philippines was part of the 58 countries participating in the global Mathematics assessment conducted by Trends in International Mathematics and Science Study (TIMSS). The results further revealed that Filipino students trailed behind other countries in international Mathematics assessments, with the Philippines ranking the lowest (Magsambol, 2020). Moreover, various educational interventions have been created, such as modules to improve numerical skills, particularly in understanding fundamental mathematical concepts. Nonetheless, poor performance in this area remains evident (Guinocor et al., 2020).

In the Division of Davao City, specifically the Tugbok District, a study was conducted by Galabo, Abellanosa, & Gempes (2018) with 327 first-year high school students in Cluster 6 of Tugbok Secondary Schools. Based on the three achievement test results, the student's academic performance in Mathematics is very low, particularly in fractions, decimals, percentages, geometry, and measurements. The results further explained that the students had not mastered the set competencies in Mathematics.

The researchers believe that this study is timely, especially given the current changes in learning modalities as a result of the COVID-19 pandemic. Several cases and positions for school closures have arisen as a result of the pandemic around the world. Face-to-face education was not possible, which nearly brought all academic activities to a complete standstill (Yusuf, Olajide-Yusuf, & Olajide, 2022). COVID-19 significantly impacts the country's educational landscape, especially the learning modes. Thus, this research is helpful, particularly in determining the influence of various interrelated variables such as time management and self-directed learning that may affect the academic performance of students in Mathematics in the blended learning modality.

The results and findings of this study can be used as a basis for creating interventions and programs to address problems in students' academic performance in Mathematics. Moreover, the results of this study will be disseminated at the division level of the Department of Education (DepEd) to serve as a guide in implementing blended learning in public schools in the future. It will also be presented at various research presentations so that the results and findings can be utilized and disseminated on a larger scale.

Research Objectives

This study aimed to determine whether time management and self-directed learning significantly predict the academic performance of students in Mathematics.

Specifically, this study sought to answer the following questions:

1. What is the extent of time management of students in terms of:
   1.1 time planning;
   1.2 time attitude; and
   1.3 time wasting?
2. What is the level of self-directed learning of students in terms of:
   2.1 learning motivation;
   2.2 planning and implementing;
   2.3 self-monitoring; and
   2.4 interpersonal communication?
3. What is the level of the academic performance of students in Mathematics in terms of test scores?
4. Is there a significant relationship between:
   4.1. time management and the academic performance of students in Mathematics; and
   4.2. self-directed learning and the academic performance of students in Mathematics?
5. Do time management and self-directed learning significantly predict the academic performance of students in Mathematics?

Hypotheses

The following hypotheses were tested at a 0.05 level of significance:

1. There is no significant relationship between time management and the academic performance of students in Mathematics.
2. There is no significant relationship between self-directed learning and the academic performance of students in Mathematics.
3. Time management and self-directed learning do not significantly predict the academic performance of students in Mathematics.

Theoretical and Conceptual Framework

This study is anchored on Social Cognitive Career Theory by Lent, Brown, & Hackett (1994), which discusses how people establish educational and vocational interests, make academic and occupational choices, and achieve success and stability in their academic and professional lives. Moreover, the Social Cognitive Career Theory stated that time management is an important factor that can affect academic performance.

Nasrullah_PhD & Khan_PhD. (2015) revealed that students' academic performance is predicted by time management. The study further explains that students with proper time management are positively correlated with better academic performance. Erdemir & Tomar (2019) support the claim of Sevari & Kandy (2011), which further elaborated that time management is positively associated with students' academic performance. Also, Nigussie (2019) mentioned that time management significantly predicts academic performance, indicating that students with better time management have higher academic performance. The study further discussed that those students with better time management have higher academic performance. Razali, Rusiman, Gan, & Arbin (2018) classified time planning, time attitudes, and time-wasting as indicators of time management.

This study is also seen through the proposition of Chou & Chen (2008), which stated that self-directed learning is one of the key factors that predicted the academic performance of students. Furthermore, self-directed learning has been positively correlated to academic performance, indicating students who learn on their own achieve higher academic performance (Lounsbury, Levy, Park, Gibson, & Smith, 2009). In the study of Shen, Chen, & Hu (2014), salient domains in measuring self-directed learning had been identified: learning motivation, planning and implementing, self-monitoring, and interpersonal communication were the four domains that measure self-directed learning. On the other hand, Borowski (2018) further discussed that grades, grade point average (GPA), and scores on standardized tests or examinations are often used to measure academic performance.

Figure 1 shows the conceptual paradigm of the study. As shown in the figure, time management, self-directed learning, and academic performance are the variables of this study. Time management acts as the independent variable which is hypothesized to influence the academic performance of students in Mathematics as the dependent variable with the following indicators: time planning, time attitudes, and time wasting.

Furthermore, self-directed learning is another independent variable with the following indicators: learning motivation, planning and implementing, self-monitoring, and interpersonal communication, which is hypothesized to influence the academic performance of students in Mathematics. The figure also displays the influence of time management and self-directed learning on the academic performance of students in Mathematics. The students' test scores from a researcher-made summative assessment will be the measurement of academic performance in Mathematics.

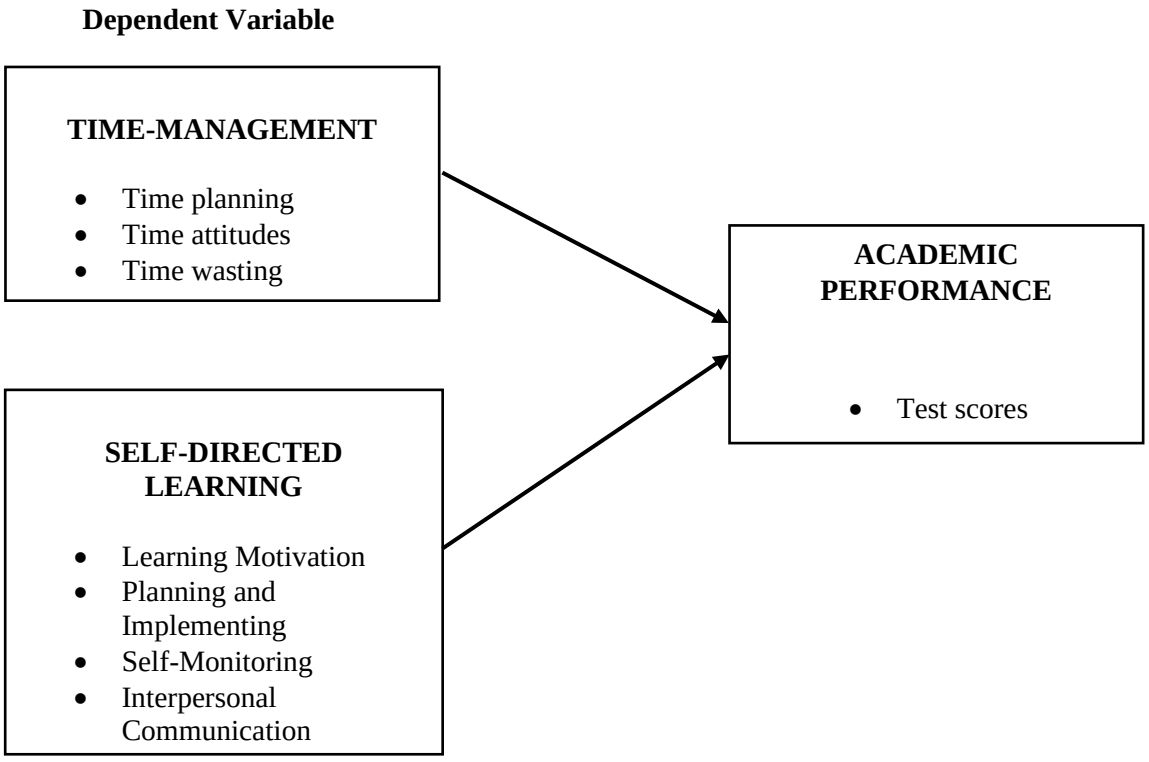

Figure 1. Conceptual Paradigm of the Study

2. Literature Review

Academic Performance in Mathematics

Academic performance determines the efficiency and efficacy of an educational system's quality and standards (Aguirre & Legaspi, 2020). Schools and parents have higher expectations of students' academic performance or achievement, believing that more excellent academic results would lead to better employment opportunities and future stability (Narad & Abdullah, 2016). Performance in Mathematics is about efficiently engaging someone's knowledge of mathematical concepts and facts (Macaso & Dagohoy, 2022; Schoenfeld, 2014).

Academic performance generally refers to a student's performance in academic areas, including Mathematics (Subramanian, 2016). Academic performance is a student's ability to meet short and long-term educational goals (Writer, 2020).

In addition, academic performance is regarded as the knowledge acquired by the students and measured by the teacher through grades. It is also mentioned that performance is measured based on the results of different assessments. Both teachers and students also set educational goals, which must be met in a given period (Narad & Abdullah, 2016). Also, Alshuaibi, Alshuaibi, Shamsudin, and Arshad (2018) stated that the outcome of education could be measured by an academic performance by meeting the educational objectives. Borowski (2018) further discussed that grades, grade point average (GPA), and scores on standardized tests or examinations are often used to measure academic performance.

Meanwhile, in the Philippines, specifically in the Division of Zambales, Moraña, Edaño, & Punzalan (2017) conducted a study with 12,266 second-year students selected from different high schools. The study aims to determine academic performance in Mathematics based on National, Regional, and Division Achievement Tests (NAT). The study revealed that the final grade averaged 79.30, described as poor, indicating the poor performance of Filipino students in Mathematics. Moreover, the Philippines' performance in Mathematics subject has lagged below those of other nearby Asian countries (Care et al., 2015).

On the other hand, an intervention was made by the Department of Education to address the poor academic performance of the students. The Department of Education incorporated Strategic Intervention Materials (SIM) into the teaching process. It has been carefully prepared and tailored to offer remedial for low-achieving students (Dy, 2011). In addition, Dumigsi & Cabrella (2019) also looked at the usefulness of Strategic Intervention Material (SIM) as math remediation for Grade 9 pupils. According to the findings, using Strategic Intervention Material (SIM) improves academic performance, indicating that students under SIM perform better.

In blended learning, Oliver & Stallings (2014) stated that blended learning produces equal learning improvement and produces better achievement or performance. In addition, blended learning improves learning outcomes by integrating technologies and the learning environment Ceylan & Kesici (2017).

Time Management

Time management has been found to have positive a impact in several studies. Time management has positively impacted learning and results (Adams & Blair, 2019). Time management is a set of concepts, practices, skills, tools, and systems that work together to help individuals obtain more value for their time to improve their quality of life (Subramanian, 2016).

Moreover, good time management enables people to work smartly and efficiently. They consume less time but can do more work; even then, there are time restrictions and high time pressure (Juneja, 2015). In addition, time management can help an individual achieve greater productivity and efficiency, a better professional reputation, less stress, increased prospects for growth and development, and more meaningful life and career goals (MindTools). Furthermore, time management is vital in enhancing academic success and accomplishments. Students should manage their time efficiently, including setting goals and priorities, using time management methods, and organizing their time (Nasrullah_PhD & Khan_PhD, 2015).

Also, time management plays a vital role in a corporate. Effective time management helps employees accomplish their tasks on time. It is essential to allot specific time slots for tasks. In addition, students who aspire to management courses or any professional course need to know the value of time to reach the peak of success and stay firmly rooted at the top (Juneja, 2015).

Time Planning

Time planning is creating, setting goals and targets, and working hard towards achieving those goals and targets. Time planning creates a direction that motivates someone to accomplish the given tasks on time. One should plan based on how one wants to move forward (Juneja, 2015). Moreover, planning can help people navigate their present to future paths with demonstrated progress toward achieving their goals. People can bring their dreams to reality by setting and working toward specific short and long-term goals (Price, 2018).

Most students are having problems managing their time. Most students spend their time on unnecessary activities. The biggest problem that leads to wasting time is not planning the time well. Effective time planning helps students save time. Students should know how to use time efficiently by making an advanced plan, determining study time, and following discipline (Gayef, Tapan, & Haydar, 2017). Setting goals and engaging in other strategic planning activities have also been shown to help students perform better (Kizilcec, Pérez-Sanagustín, & Maldonado, 2017). In addition, individuals should have a list of the things that they have to do daily or weekly, set a time frame, and prioritize activities that increase time awareness so that, in the long run, they will be able to deal with all the set activities (Nigussie, 2019).

Time Attitudes

Time attitudes are a person's positive behaviors that help them effectively utilize time while doing specific tasks. Time attitude is more attitudinal in nature (Razali et al., 2018). Time management

practices are linked to individuals' awareness and attitude toward managing their time. Awareness and time attitude are tantamount to individuals' perception of having control of their time (Nigussie, 2019).

Time attitude can also be defined as the belief that one is in control of their time, that one is managing their time well, and that one is making good use of their time (Sevari & Kandy, 2011). In addition, time attitudes are the fundamental aspects of human awareness. The perception of time shapes people's consciousness, their ability to perceive the world around them, and, eventually, their sense of self (Di Lernia et al., 2018). Furthermore, people with more control over how their time is spent completing their daily or weekly tasks indicate positive time attitudes. Consequently, they know how to choose activities that may have productive outcomes (Kaushar, 2013).

Time Wasting

Individuals waste time doing and accomplishing very little in many cases because they either focus their efforts on the wrong responsibilities or are unable to focus effectively. Time management directly affects students' academic performance (Mercanlioglu, 2010)**.** Time wasting is the act of wasting or spending time idly and in an unfruitful manner to procrastinate or be lazy, especially with work or responsibilities (Razali et al., 2018). In addition, time-wasting is an unnecessary activity that inhibits individuals from attaining goals in the most effective way (Kohnová & Salajová).

Time-wasting activities affect productivity. Instead of prioritizing the task, individuals are preoccupied with the wrong things. Most people are easily distracted, occupied with their ideas, feelings, and sensations, and are unaware of or uninterested in the activity at hand (Darden, 2015). Furthermore, Kohnová & Salajová (2018) stated that time-wasting could be external or internal. External time-wasting is caused by other people or circumstances that an individual does not have control over. On the other hand, internal time-wasting includes poor communication, being disorganized, procrastination, and a lack of planning.

Self-directed Learning

Khalid, Bashir, & Amin (2020) define self-directed learning as a strategy for assessing students' learning needs, guiding them toward cooperative learning, and assessing their subsequent knowledge. Self-directed learning is also characterized by students' willingness to participate in different learning activities. They are capable of planning and implementing learning activities on their own, without the assistance of others (Lounsbury et al., 2009). Furthermore, self-directed students can also self-regulate their learning (Jossberger, Brand-Gruwel, Boshuizen, & Van de Wiel, 2010). They can evaluate the task, their learning and skills, and their strengths and weaknesses. They also prepare and implement what approach should be used in a particular situation (Khiat, 2017).

Moreover, students become independent learners if they learn to self-direct. Students can benefit from self-directed learning. Self-directed learning helps them process their knowledge, learn to be helpful, assess their learning needs, create learning, point out the resources needed, and select and implement learning strategies (Nuri, 2019).

Learning Motivation

Koff & Mullis (2011) characterized students' learning motivation as a willingness to make an effort to learn, which was based on the students' choice of specific learning activities and their efforts in doing those activities. Learning motivation is a force that drives a person to make changes marked by the emergence of emotions and reactions to achieve goals. In addition, motivation inspires people to strive hard to achieve their objectives. Motivation can be seen in the willingness and desire of someone to carry out specific activities and tasks in a well-organized manner that eventually leads to the attainment of particular objectives and goals (Kapur, 2019).

Furthermore, learning motivation is considered an essential factor in students because it stimulates motivation in learning (Shen et al., 2014). Additionally, learning motivation should be more vital than the other areas of readiness to practice self-directed learning. Individuals who have the desire or

objectives are those individuals who have developed their sense of motivation toward self-directed learning (Boyer, Edmondson, Artis, & Fleming, 2014). On the other hand, Ashcraft (2019) mentioned that learning motivation inspires students to learn happily and thoughtfully, which was a method of teaching systematic, concentrated, and able to choose their activities.

Planning and Implementing

Planning and Implementing are regarded as the ability of an individual to set personal learning objectives independently and utilize suitable approaches and different learning resources in achieving learning objectives effectively (Lounsbury et al., 2009; Nuri, 2019). In addition, planning needs to be an action-oriented type of planning and must be coupled with implementation (Kabeyi, 2019).

Planning refers to the decision-making process on specific things to do and how to accomplish them. Planning happens on a day-to-day decision made by individuals. People who plan well develop a rational, methodical decision-making process that leads to the best outcomes (Litman, 2013). Furthermore, students with learning plans help them attain higher learning outcomes and motivate them to learn on their own (Kastenmeier et al., 2018). On the other hand, Olsen (2021) described implementation as a process that materializes plans into actions to achieve objectives. Thus, implementing your strategic plan was as necessary, or even more important than your strategy

Self-Monitoring

Self-monitoring is one of the significant elements of self-directed learning (Zhu & Bonk, 2019). Self-monitoring is examining one's behaviors (Eva & Regehr, 2011) or evaluating and monitoring learning results (Shen et al., 2014).

Self-monitoring focuses on students' abilities to keep records and assess their development toward specific learning outcomes. Self-awareness is part of self-monitoring, which helps students to keep themselves on track and in control of their learning development. Also, students who show awareness of themselves will probably do better academically. Students who are aware of themselves show an increase in their performance (David & Okon, 2016).

Also, Zian (2021) stated that self-monitoring strategies are individualized plans to improve independent functioning in academic and other aspects such as behavioral, self-help, and social areas. Experts emphasize the importance of students' self-monitoring rather than focusing on reducing unwanted behaviors. Even without direct interventions, when self-monitoring skills are improved, there is often a corresponding decrease in unwanted behaviors.

Moreover, self-monitoring provides feedback to students after the teachers evaluate their behavior. It also facilitates communication between students and their parents. In addition, self-monitoring is beneficial to students. Students who self-monitor increase their awareness of their behaviors. Additionally, self-monitoring incorporates academic activities that produce positive results (Rock, 2005).

Interpersonal Communication

Interpersonal communication involves two or more individuals exchanging information, ideas, feelings, and meaning through spoken and non-verbal means (Bajracharya, 2018). Interpersonal communication is also regarded as communicating information, knowledge, and understanding from one individual to another (Saraih, Azmi, Sakdan, & Amlus, 2019).

Interpersonal communication can boost individuals' happiness levels, making them feel obligated to reciprocate by improving their performance (Wulandari, 2014). Internal and external environmental aspects influence students' learning processes. Learning is a process of interaction in different situations around the student (Khodijah, 2018).

Also, interpersonal communication has many benefits, including fostering students' interactions in learning and establishing and maintaining good relationships between individuals. Furthermore, to assist in transmitting knowledge or information, the change of attitudes and behaviors, the resolution of human relations issues, improving self-image, and establishing a path to success. Thus, interpersonal communication helps individuals build solid connections and long-lasting relationships with other people (R, 2019).

Time Management and Academic Performance

Time management is defined as the act of planning and managing the time allocated for a specific activity effectively (Juneja, 2015). Effective time management is linked to improved academic achievement, yet a lot of students find it challenging to balance their schoolwork and their daily lives (Adams & Blair, 2019).

Time management or proper administration of time is an influential factor in academic success (Mahasneh, Al-Zoubi, Batayeneh, Al-Sawalmeh, & Mahasneh, 2013). Several studies have shown that students' academic performance is significantly affected by time management (Mercanlioglu, 2010; Sevari & Kandy, 2011).

Furthermore, Baniaga, Porquerino, Vidad, & Subia (2018) stated that academic performance directly correlates with one's time management. Students who believe they have adequate time management abilities are typically more engaged and driven to succeed, leading to higher academic performance. In addition, time management affects academic output positively in a way that students better manage their curriculum and achieve learning objectives (Alyami, Abdulwahed, Azhar, Binsaddik, & Bafaraj, 2021). Moreover, Sevari & Kandy (2011) mentioned that time management predicts academic performance. The study further explains that students with good academic performance are good time managers.

Moreover, a similar study was conducted by Nigussie (2019) with 120 students. The study revealed that time management and the academic performance of students have a strong connection. Thus, students with better time management have higher students' academic performance. Additionally, a similar study conducted by Adams & Blair (2019) further explained that students' cumulative grade point average and students' perceived control of time are significantly correlated.

Likewise, time management is a predictor that significantly influences students' academic performance. Students who managed their time efficiently had higher standardized test scores (Cano, 2006).

Self-directed Learning and Academic Performance

Self-directed learning constantly appears to be helpful for students (Khalid et al., 2020). Self-directed learning is defined as students' awareness of gaining knowledge with or without encouragement from others (Nuri, 2019). It is also regarded as individuals taking the initiative, examining individual's own learning, creating objectives, recognizing the materials needed, and selecting and applying suitable learning strategies, assessing learning outcomes (Brandt, 2020).

Furthermore, self-directed learning has been connected with students' academic performance. It was also considered a predictor of academic performance (Cazan & Schiopca, 2014). Additionally, Kim (2017) model also suggested that, in path analysis, self-directed learning directly impacts academic performance; as a result, self-directed learning contributes to students' academic performance (Oducado, 2021).

Moreover, the study of Alotaibi (2016) revealed that students with a high level of self-directed learning are more likely to be actively immersed in their learning, which improves their academic achievement in Mathematics. Similarly, students who have high self-directed learning think critically and take the initiative to achieve their learning requirements without the assistance of others in order to improve their learning outcomes and academic performance (Herlo, 2017).

3. Research methodology

Research Design

This study employed a quantitative research design utilizing descriptive and correlational approaches. Nassaji (2015) conceptualized descriptive research as a research design that collects and analyzes quantifiable data using quantitative procedures. In addition, descriptive research design involves gathering data, describing events, and organizing, tabulating, depicting, and describing the data collection (Dahiya & Gayatri, 2018).

On the other hand, a correlational research design measures two or more variables and assesses their correlation (Jhangiani, Chiang, Cuttler, & Leighton, 2019). Moreover, the correlational design will be utilized to determine the strength and nature of the relationship between the variables (Creswell, 2003).

Research Respondents

The respondents of this study were Grade 9 students from four different private schools in Davao City, Davao del Sur, for the school year 2021 - 2022. The selected respondents in this study were officially enrolled in the blended learning modality.

In this study, there was a total population of 246 Grade 9 students in four private high schools. Specifically, there were 5 students in school A, 152 students in school B, 63 students in school C, and 26 students in school D. With the use of the Online Raosoft Sample Size Calculator with a confidence level of 95%, a margin of error of 5% percent, there were 152 samples. Then, the researchers utilized stratified random sampling to select the respondents. Stratified random sampling is a method for sampling from a population in which the population is subdivided, and samples are selected randomly from each subgroup (Frey, 2018).

Research Instrument

In the process of gathering the data, this study utilized an adapted research instrument from the Time Management Scale by Alay & Kocak (2002), an adopted research instrument from the Self-Directed Learning Instrument (SDLI) by Cheng, Kuo, Lin, & Lee-Hsieh (2010), and a researcher-made summative assessment.

The adapted research instrument in time management and researcher-made summative assessment in Mathematics underwent reliability and validity tests to determine the instrument's appropriateness, internal validity, and consistency. The time management scale has an original Cronbach alpha of 0.83, indicating that the items have excellent internal consistency as well as the results of the researcher's pilot testing with a Cronbach alpha of 0.89. The modified research instrument consists of 26 items, with the following domains: time planning (16 items), time attitudes (7 items), and time-wasting (3 items).

Moreover, the researcher-made summative assessment underwent pilot testing and item analysis after the validity and reliability tests. The instrument has excellent internal consistency based on the Cronbach alpha of 0.84.

Time Management Scale

In measuring students' time management, the researchers adopted the Time Management Scale by Alay & Kocak (2002). The researcher specifically modified the item under time wasting, "*Do you smoke an average of at least one pack of cigarettes per day?*". This questionnaire was modified so that all the items will be relevant to the study and expressed understandably and appropriately at the respondents' level. The response options structure was a 5-point Likert scale ranging from 1 to 5, with 1 "never", 2 "seldom", 3 "sometimes", 4 "often", and 5 "always".

The following parameter limits, with its corresponding descriptions, were applied to the extent of time management.

Parameter Limit	Descriptive Equivalent	Interpretation
4.20 – 5.00	Very Highly Extensive	This means that time management is manifested at all times.
3.40 – 4.19	Highly Extensive	This means that time management is manifested most of the time.
2.60 – 3.39	Moderately Extensive	This means that time management is manifested occasionally.
1.80 – 2.59	Less Extensive	This means that time management is manifested in a few instances.
1.0 – 1.79	Least Extensive	This means that time management is not manifested at all.

Self-Directed Learning Instrument (SDLI)

In measuring students' self-directed learning, the researchers utilized an adopted instrument from the Self-Directed Learning Instrument (SDLI) by Cheng et al. (2010). It is a 20-item questionnaire with the following domains. The instrument has a value of Cronbach's alpha of 0.84, which indicates good psychometric validity and reliability. The response options structure was a 5-point Likert scale ranging from 1 to 5, with 1 "strongly disagree", 2 "disagree", 3 "moderately agree", 4 "agree", and 5 "strongly agree".

The following parameter limits, with its corresponding descriptions, were applied to the level of self-directed learning.

Parameter Limits	Performance Level	Interpretation
4.20 – 5.00	Very High	This indicates that self-directed learning is very much observed.
3.40 – 4.19	High	This indicates that self-directed learning is much observed.
2.60 – 3.39	Moderate	This indicates that self-directed learning is fairly observed.
1.80 – 2.59	Low	This indicates that self-directed learning is less observed.
1.0 – 1.79	Very Low	This indicates that self-directed learning is not observed.

Researcher-made Summative Assessment

In measuring students' academic performance in Mathematics, the researcher utilized a 50-item multiple-choice researcher-made summative assessment. In addition, all the items were crafted based on the DepEd Most Essential Learning Competencies (MELCs) for the second quarter, S.Y. 2021 – 2022). Also, the parameter limits and descriptive equivalents of DepEd Order No. 08, series of 2015, or the Policy Guidelines on Classroom Assessment for the K to 12 Basic Education Program, were adopted by the researchers.

Responses for the multiple-choice questions were coded as follows:

Point	Description
1	The student answered the question correctly.
0	The student answered the question incorrectly.

In evaluating the level of academic performance of students in Mathematics in terms of test scores, the following parameter limits were used to interpret the data.

Parameter Limits	Performance Level	Interpretation
90-100	Outstanding	This means that students' academic performance in Mathematics is very highly proficient
85-89	Very Satisfactory	This means that students' academic performance in Mathematics is highly proficient
80-84	Satisfactory	This means that students' academic performance in Mathematics is moderately proficient
75-79	Fairly Satisfactory	This means that students' academic performance in Mathematics is slightly proficient
<74	Did Not Meet Expectations	This means that students' academic performance in Mathematics is not proficient

4. Results and Discussions

Extent of Time Management of Students

Table 1 is the extent of time management of students. Among the three indicators, the indicator time attitude has the highest mean of 3.96, followed by the indicator time planning with a mean of 3.83. Both indicators have the same descriptive equivalent of highly extensive, which means manifested most of the time. On the other hand, the indicator time wasting has the lowest mean of 2.54 with a less extensive descriptive equivalent, which means manifested in few instances.

Table 1. Extent of Time Management of Students

Indicators	SD	Mean	Descriptive Equivalent
Time Planning	1.03	3.83	Highly Extensive
Time Attitude	0.97	3.96	Highly Extensive
Time Wasting	1.03	2.54	Less Extensive
Overall Mean	**1.01**	**3.44**	**Highly Extensive**

The extent of time management has an overall mean of 3.44 with a descriptive equivalent of highly extensive. This indicates that students' time management is manifested most of the time.

Moreover, the overall standard deviation of 1.01 shows the measure of the dispersion of the data in relation to the mean. This indicates that data are slightly spread out around the mean. This implies that the data are homogenous.

This explains that students with good time management can work smartly and efficiently. Students set goals and priorities and organize their time. Moreover, they can effectively prepare, organize, and achieve their goals with greater productivity in a given period.

In addition, MindTools stated that time management can help a person achieve more productivity and efficiency, a better professional reputation, less stress, more significant growth, and development opportunities, and more meaningful life and career goals. Moreover, (Juneja, 2015) mentioned that

effective time management enables individuals to work efficiently. Even under time constraints and intense pressure, they can accomplish more work in less time.

Level of Self-directed Learning of Students

Table 2 is the level of self-directed learning. Among the four indicators, the indicator learning motivation has the highest mean of 4.38 with a descriptive equivalent of very high, which means very much observed. The indicator self-monitoring has the second-highest mean of 4.10, followed by interpersonal communication with a mean of 4.06, and planning and implementation with the lowest mean of 4.02. Moreover, these three indicators have the same descriptive equivalent of high, which means much observed.

The level of self-directed learning of students has an overall mean of 4.14 with a descriptive equivalent of high. This indicates that students' self-directed learning is much observed.

Moreover, the overall standard deviation of 0.87 shows the measure of the dispersion of the data in relation to the mean. This indicates that data are clustered around the mean. This also implies that the data are homogenous.

Table 2. Level of Self-directed Learning of Students

Indicators	SD	Mean	Descriptive Equivalent
Learning Motivation	0.78	4.38	Very High
Planning and Implementing	0.87	4.02	High
Self-monitoring	0.90	4.10	High
Interpersonal Communication	0.92	4.06	High
Overall Mean	**0.87**	**4.14**	**High**

The results show that students can work independently, take the initiative, analyze their learning needs, formulate and establish learning objectives, select and employ appropriate strategies, and evaluate their learning. Moreover, students believe they are prepared to engage in learning activities and discover new information.

The result conforms with the findings of (Khalid et al., 2020), who mentioned that self-directed learning assesses students' learning needs, guiding them toward suitable learning and assessing their subsequent knowledge. Self-directed learning is also characterized by students' willingness to participate in different learning activities.

Moreover, in self-directed learning, the students can use different resources, such as self-learning reading, involvement in group discussions, and reflective writing exercises (Kapur, 2019). In addition, students can discover a wide range of interests. Self-directed reinforces collaboration, among others. Students can work together with peers in the process of learning (People, 2021).

Status of the Academic Performance of Students in Mathematics

Table 3 shows the level of academic performance of students in Mathematics in terms of scores from the summative assessment, with a mean of 73.07. This indicates that the academic performance of students in Mathematics in terms of test scores did not meet expectations. Moreover, the standard deviation of 7.77 is small. This value shows how data are spread out around the mean, which means that students' scores are relatively close to the mean. This implies that the majority of the student's levels of performance are more likely the same as each other.

The results indicate that student's academic performance in Mathematics is not proficient. The results revealed that the students had not mastered the required competencies in Mathematics.

Table 3. Status of the Academic Performance of Students in Mathematics

Variable	SD	Mean	Descriptive Equivalent
Academic Performance	7.77	73.07	Did Not Meet Expectations

The result conforms to the finding of Oducado & Estoque (2021), which stated that students had a poor academic performance during the global COVID-19 outbreak. In addition, it is also remarkable that the pandemic has greatly impacted the academic performance of students at school. Moreover, a similar finding was found in the study of Mahdy (2020), that the COVID-19 pandemic lockdown had affected the student's academic performance.

Several factors were found to be relevant to the poor academic performance of students during the COVID-19 pandemic. In the study of Oducado & Estoque (2021), high levels of stress and low student satisfaction were significant factors that contributed to low academic performance.

In addition, students' stress levels increased, and their academic performance decreased. Moreover, during a pandemic, students endure greater mental stress than in prior times (Caratiquit, 2022; Uddin & Uddin, 2021). Also, Hafezi and Etemadinia (2022) stated that due to the prevalence of COVID-19 and the closure of schools, the virtualization of classrooms and the reduction of students' social relationships cause negative changes in students' academics.

Significance of the Relationship between Time Management and Self-directed towards Academic Performance of Students in Mathematics

Table 4 presents the relationship between variables: time management and academic performance, and self-directed learning and academic performance.

The time management and academic performance of students have a computed r-value of 0.076, which indicates a negligible correlation. Moreover, the p-value of 0.349 is greater than the 0.05 level of significance, which indicates weak evidence against the null hypothesis. Thus, the null hypothesis is not rejected. This means that there is no significant relationship between time management and the academic performance of students in Mathematics.

Table 4. Significance of the Relationship between Time Management and Self-directed Learning towards Academic Performance of Students in Mathematics

Variables Correlated	r	p-value	Decision on H_o	Decision on Relationship
Time Management and Academic Performance	0.076	0.349	Do not Reject	Not Significant
Self-directed Learning and Academic Performance	0.153	0.059	Do not Reject	Not Significant

Moreover, the coefficient of determination (r^2) of the two variables is interpreted as a 0.58% degree of attribution between time management and the academic performance of students. The remaining 99.42% degree of attribution is the other factor that may have an influence on academic performance.

In contrast, this result is congruent with the study of Razali et al. (2018), which shows no relationship between time management and students' academic performance. However, the finding does not conform to the theoretical framework of the study, which stated that students' academic performance is predicted by time management (Nasrullah_PhD & Khan_PhD, 2015). The study further explains that students who manage their time well positively impact their academic achievement. In addition, students who managed their time efficiently had higher standardized test scores (Cano, 2006).

Meanwhile, self-directed learning and the academic performance of students have a computed r-value of 0.153, which means a negligible correlation. Furthermore, the p-value of 0.059 is greater than the 0.05 level of significance, indicating that the evidence against the null hypothesis is weak. The null hypothesis is therefore not rejected. This indicates that there is no significant relationship between self-directed learning and the academic performance of students in Mathematics.

Furthermore, the coefficient of determination (r^2) of the two variables is interpreted as a 2.34% degree of attribution between self-directed learning and academic performance. The remaining 97.66% degree of attribution is the other factor that may have an influence on academic performance.

The result is supported by the findings of Deyo, Huynh, Rochester, Sturpe, & Kiser (2011) who studied the relationship between students' self-directed learning and academic performance. The study revealed no significant association found between self-directed learning and academic performance. It can be gleaned that other factors are associated with academic performance other than self-directed learning.

On the other hand, the finding does not conform with the theoretical framework of the study which stated that self-directed learning is one of the key factors that predict the academic performance of the students (Chou & Chen, 2008). In addition, self-directed learning has positively correlated to academic performance, indicating that students who learn independently achieve higher academic performance (Lounsbury et al., 2009).

Significance of the Influence of Time Management and Self-Directed Learning on Academic Performance of Students in Mathematics

Since the significance of the relationship between time management and self-directed learning toward academic performance is not established, these two variables do not significantly predict the academic performance of students in Mathematics. Furthermore, time management and self-directed learning do not significantly influence students' academic performance in Mathematics.

Overall, the finding contradicts the theoretical framework of this study, which is the Social Cognitive Career Theory by Lent et al. (1994), which indicates that time management is a key element impacting academic performance. Also, Nigussie (2019) stated that time management is a predictor of academic performance, implying that better time management students have better academic performance.

Moreover, the finding contradicts the theoretical framework of this study, which is anchored on the propositions of Hsu & Shiue (2005) and Alotaibi (2016), who concluded that self-directed learning is a strong predictor of academic performance. Students with a high level of self-directed learning are more likely to be actively engaged in their studies, enhancing their academic performance in Mathematics.

5. Conclusion

5.1. Conclusion

Conclusions were drawn based on the findings of the study.

1. The time management of students is manifested most of the time.
2. The self-directed learning of students is much observed.
3. The academic performance of students in Mathematics is not proficient.
4. There is no significant relationship between time management and the academic performance of students in Mathematics. Also, there is no significant relationship between self-directed learning and the academic performance of students in Mathematics.

5. Time management and self-directed learning do not significantly predict the academic performance of students in Mathematics.

5.2. Limitation

This study only highlighted 152 officially enrolled students and 4 private schools that were offering blended learning modalities for the school year 2021 – 2022 in Davao City, Philippines.

5.3. Suggestions

The following are the recommendations of the study:

1. Students should maintain their good time management practices by continuing to manage their time efficiently to achieve greater productivity. Moreover, students should also continue applying appropriate learning strategies to enhance self-directedness.
2. Teachers are encouraged to create or integrate intervention remedial classes for low-achieving students to improve their academic performance in Mathematics.
3. Future researchers may consider conducting this study in different settings, such as in public schools and other divisions since this study was conducted in private schools. Also, future researchers may consider exploring possible reasons for low academic performance, specifically during this pandemic.

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