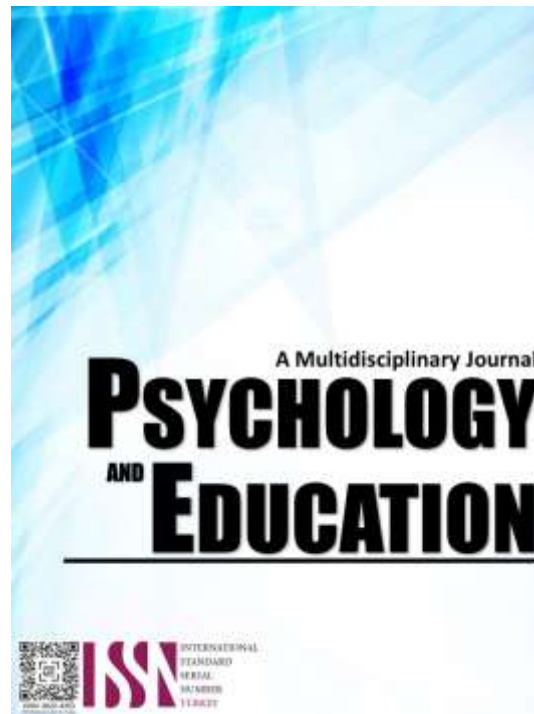


FACTORS AFFECTING ACADEMIC PERFORMANCE OF GRADE 10 LEARNERS IN MATHEMATICS: BASIS FOR LEARNING ENRICHMENT PROGRAM



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Factors Affecting Academic Performance of Grade 10 Learners in Mathematics: Basis for Learning Enrichment Program

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Abstract

This study aimed to determine the association and effect of various factors on the academic performance of Grade 10 learners in Pitogo District, Division of Quezon, to develop a learning enrichment program. A survey questionnaire that the researcher had designed and a data collection form for the respondents' grades for the second quarter served as the primary tools for acquiring the necessary data. One hundred ninety-seven (197) respondents were selected systematically for the study. This study employed quantitative research utilizing a descriptive-evaluative correlational design. The gathered information was examined using an arithmetic mean and percentage to determine the associated factors and level of academic performance of grade 10 students, respectively. The significant relationship between the associated factors and academic performance was statistically analyzed using Spearman's rank-order correlation. Findings revealed that all of the factors affecting the academic performance of the students were significantly associated with each other. However, only teaching approaches and communication skills have a significant effect on their academic performance. Based on the conclusions, it was recommended that schools use the proposed learning enrichment program that will improve grade 10 students' academic performance. Likewise, future researchers may also investigate other variables that may affect students' learning in mathematics or other learning areas.

Keywords: *factors, academic performance, learning enrichment program*

Introduction

Mathematics education has long been recognized as a significant factor in the development, prompting nations to emphasize this in their national agenda (Patena & Dinglasan, 2013). Filipino pupils are found to do alarmingly poorly in subjects demanding higher-order thinking skills, despite being excellent at acquiring knowledge; As a result, policymakers and educators worldwide are highly concerned with how pupils learn and how to assess students' success in these areas. It is undeniable that most students are not ready to master Mathematics. The low students' knowledge level and depressing math performance results have become a significant problem for our nation and a significant source of frustration for educators.

Indeed, the Philippine educational system faces enormous obstacles, including how to build student abilities and enthusiasm in disciplines such as mathematics. The Philippines ranked second-lowest in mathematics among 79 participating countries and economies in the 2018 Programme for International Student Assessment (PISA). The Philippines scored 353 in mathematics, which is lower than the average of participating Organization for Economic Cooperation and Development (OECD) countries. The Philippines' Department of Education's (DepEd) report in the

National Achievement Test (NAT) on the mean percentage score (MPS) for high school students fell below the pupils' desired performance.

Furthermore, based on 2016-2017 data from the Global Competitiveness Report (GCR) published by the World Economic Forum, the Philippines is 79th of 138 participating countries in the quality of Mathematics Education. The 2016-2017 GCR marks the first time the country's ranking dropped after six consecutive years of improvement since the 2010-2011 GCR.

The researcher observed that most students have difficulties in learning mathematics. Also, the researcher is troubled about the fact that there are factors affecting the academic performance of high school students in the subject area. Thus, she sought out these factors to provide an enrichment program that would help students to learn in their most convenient ways.

According to Kele (2018), pupils must understand mathematics throughout their education. Student's ability to understand mathematics might be hampered if they do not understand the concepts, terminology, content, and methods used in this field. According to Patena and Dinglasan (2013), students' performance (academic achievement) is vital in creating the best quality graduates who would become excellent leaders

and personnel for the country, and thus responsible for the country's economic and social progress. Thus, they highlighted that various factors influence students' performance quality.

According to Ebele and Olofu (2017), one of the aspects that can have a significant impact on student's performance is study habits. If the person concerned did not pay attention, the effect on student's performance may worsen. Students must have good study habits to excel in life because it is the students' study habits that aid in getting relevant and applicable knowledge. As a result, the absence of these talents would result in students performing poorly in school (Kaur & Pathania, 2015).

Furthermore, despite the ease of access to technology and online connectivity, students' technological abilities are disconnected from the educational framework and more focused on social skills (Wakefield & Frawley, 2020). As a result, uncontrolled usage of ICT by young people may have a direct impact on their academic achievement. In the past, many teaching practitioners used teacher-centered strategies to convey knowledge to students rather than student-centered methods. Until now, questions about the effectiveness of instructional approaches on student learning have constantly piqued the interest of educational researchers (Ganyaupfu, 2013). Teachers' performance in the classroom is entirely dependent on their communication skills. If the teacher has good communication skills, he or she can effortlessly transmit his or her message or deliver the lecture clearly and understandably (Khan et al., 2017).

Given the above scenario, as a classroom teacher for the past ten years handling Mathematics, the researcher is interested in investigating the different factors affecting the academic performance of Grade 10 learners. The researcher has witnessed the struggles and difficulties of Grade 10 students in learning Mathematics as the researcher has taught and delivered the lessons in Mathematics 10.

One of the significant gaps in the literature related to this area of study is that, while many countries already investigate factors impacting students' academic performance toward mathematical learning, in the division of Quezon, particularly in the district of Pitogo, there has been no study to date that has investigated this complex array of factors. Also, most of the previous studies focused only on one factor and also focused only on primary education levels and Senior High schools. This study seeks to fill an aspect

of this knowledge gap. Hence, the researcher aimed to identify the factors that may be associated with academic achievement in mathematics among the Grade 10 learners in Pitogo, Quezon, as the basis for developing a learning enrichment program.

Research Questions

The researcher wanted to work on the association and effect of various factors on the academic performance in mathematics of Grade 10 learners in Pitogo District, Division of Quezon. Specifically, this study sought to answer the following questions:

1. What are the factors affecting the academic performance of Grade 10 learners in terms of study habits along with:
 - 1.1 Time Management;
 - 1.2 Learning Motivation;
 - 1.3 Reading and Note-Taking;
 - 1.4 Memory/Remembering;
 - 1.5 Concentration; and
 - 1.6 Taking an Assessment?
2. What are the associated factors affecting the academic performance of Grade 10 students in the following learning domains:
 - 2.1 Technological Knowledge;
 - 2.2 Learning Environment;
 - 2.3 Teaching Approaches; and,
 - 2.4 Communication Skills?
3. What is the level of academic performance in Mathematics of Grade 10 learners in the second quarter?
4. Is there a significant association between the academic performance of the Grade 10 learners in Mathematics and identified factors in terms of:
 - 4.1 study habits; and
 - 4.2 learning domains?
5. Is there a significant effect between the academic performance of Grade 10 learners in mathematics and identified factors in terms of:
 - 5.1 study habits; and
 - 5.2 learning domains?
6. Based on the results of the findings, what learning enrichment program may be developed in order to improve these associated factors and the academic performance of Grade 10 learners in Mathematics?

Literature Review

Time Management

Every student should be able to manage their time correctly to successfully arrange activities, set goals,



and prioritize those things that require immediate attention and others. Time management can also improve student's decision-making abilities, allowing them to make better use of their time (EduBirdie, 2022). While there is no universally approved method for managing time, individuals such as students must respect time management and use it in many circumstances. Furthermore, being competent at planning and prioritizing, such as scheduling time and meeting deadlines, is positively associated with perceived efficacy and work-related morale.

Wong (2022) stated that everyone is thought to have a particular study habit; thus, it is crucial to figure out your preferred method of studying. Issues with study habits may have a significant impact on a student's academic success. Studying with friends has a long way to go in terms of student's study habits; it can be beneficial in that they discuss what they have read together, but it can also be detrimental in that they may not read but wind up talking during the allotted reading period, which amounts to time waste.

According to Sakirudeen and Sanni (2017), kids who know how they use their time perform well academically. It was also suggested that academicians conduct group guidance in schools to raise awareness about how students can build excellent study habits, which could lead to improved academic success. Students should have easy access to a fully working school library.

Goud (2018) revealed that students have a positive attitude toward study habits; the study focused on gender, locality, and school management type in tenth-class student's academic achievement. It is shown in the study that these factors influence the study habits of the respondents. The research emphasizes the importance of developing good study habits, such as time management.

As cited by Kapur (2018), time management is considered a skill that should be mastered by all individuals at all levels and in all walks of life. In order to avoid feeling stressed or pressurized due to work; it is required to effectively implement time management. According to the study by Khanam, Sahu, Rao, Kar & Quazi (2017), time management is one of the skills that impact the student's academic performance. The researchers conducted a study about time management and the respondent's academic achievement, which are the medical students in Odisha. The study revealed that the respondents who obtained a high percentage also had a high mean score on general time management. And so, it means that

time management is critical to improving one's academic performance.

Learning Motivation

Logically, students who desire to succeed are afraid of failing. Similarly, parents of students are terrified of seeing their children fail academically, because academic success appears to be so crucial in today's modern culture. Students frequently experience academic failure when they encounter an immense difficulty or impediment since failure is a natural part of life and essential on the route to achievement. Students who recognize that failure is unavoidable can cultivate mindsets and practices that will assist them in overcoming failure and achieving success (NSHSS, 2020).

Positive thinking among students can have a significant influence on their learning style and their study habits as a whole. This habit can be intervened through their competency learning process as a factor in learning relevant to their academic performance and their study habits (Roman, 2018). On the other hand, the positive result of a change in the study habits of the students will provide gaps in their needs in learning their thinking (Gallagher & Thordarson, 2018).

The study by Gbollie and Keamu (2017) found that when students monitor their responses and attribute outcomes to their strategies, their learning becomes self-regulated, and they exhibit increased self-efficacy, greater intrinsic motivation, and higher academic achievement. Furthermore, the study found that students who self-regulate make objectives or plans and strive to monitor and control their cognition, motivation, and behaviour based on these goals outperform their peers significantly. Furthermore, motivating beliefs are essential for student's academic progress since they impact how much students will think about, value, exert effort for, and be interested in the activity. Learners are motivated to achieve their learning objectives. It is critical to remember that inspiring learning is an essential component of excellent teaching.

According to Filgona (2020), engaging students to learn is essential for curriculum implementation. This is due to the fact that motivation is an essential aspect in teaching-learning circumstances. Learning success is determined by whether or not the learners are motivated. Learners are motivated to achieve their learning objectives. It is critical to remember that inspiring learning is an essential component of excellent teaching. This means that learner motivation

is most likely the most significant aspect of learning. Learning is intrinsically tricky; it pushes the brain to its limits and can occur only with desire. Student's drive to study is significant because student's mere presence in class is not a guarantee that they want to learn. It is simply a reflection of the fact that pupils live in a society where children are compelled to attend school. Highly motivated learners are more likely to learn quickly and make any class enjoyable to teach. In contrast, uninspired learners are more likely to learn slowly and make instruction difficult and stressful. Teachers cannot take learner's motivation for granted because modern education is obligatory, and they have a responsibility to ensure that learners are driven to learn. Teachers must persuade students to desire to do what they should do.

Reading and Note-Taking

Even though students are asked to take detailed notes all year, it is well-recognized that note-taking is beneficial to learning, retention of knowledge; and thinking, this is not the case (Özçakmak, 2019).

The most obvious benefit of taking notes is that it saves pupils from having to read the entire book. It increases pupil's comprehension skills by drawing student's attention to the subject being read or listened to. It keeps pupils from forgetting what they learn in class. It also helps kids remember crucial information and makes them self-sufficient (Bahrami and Nosratzadeh, 2017; Saravani, 2019; Umaadevi and Rekha, 2019).

The Cornell note-taking method was developed by Walter Pauk, a professor at Cornell University, in 1940 (Pauk & Owens, 2010). This method consists of dividing a sheet of paper into three segments. On the upper-left side of the sheet, keywords, abbreviations, schemes, and drawings can be used, to underline essential concepts. On the upper-right side, the student will summarize definitions or other important and relevant information. The benefit of this method is the constraint on the space that can be used to take notes, which guides the information selection process (Akintunde, 2013). Finally, at the bottom of the page, the student is advised to use a method that tests information retention, for example, a quiz. Some of the positive aspects of the technique are the ability to keep the user focused on essential tasks and taking notes in an organized style, requiring significant cognitive resources. At the same time, the structure of those resources offers the possibility to condense and reformulate the information in an easy-to-manage way, which leaves room for individual autonomy.

Regarding the negative aspects, the technique requires a long time of planning and caution on what needs to be included as vital information (Musywaroh, 2017). Note-taking is an essential aspect of the learning process, according to Sporry and Anders (2022). It aids students in learning, remembering, and recalling knowledge. Taking notes causes an individual to reconsider the issue; it forces him to reconsider his perspective. Because he is actively listening and participating in class, it also helps him focus during a lecture. Not just students can benefit from taking good notes; almost everybody who works with written text should figure out the best technique to take notes.

Taking notes allows an individual to go over important ideas from his study, reading, or listening. Writing notes in his own words, often known as note-taking, clarifies things for note-takers when they return to the content. This is far superior to relying on his recollection. That is because taking verbatim notes can hinder conceptual thinking by removing the time required to explain concepts through illustrations and diagrams rather than simply jotting down data without context.

Study habits like note-taking, usage of the library and study time allocation influenced the students' academic performance. They further recommended that group guidance should be organized in schools initiated by professional counselors in order to establish awareness of practical study habits and the provision of a functional library in secondary schools, which could lead to better performance of the students in Mathematics (Sakirudeen & Sanni, 2017).

For decades, note-taking has been a fundamental practice of academic life, particularly in lecture courses, as cited by Olatunji (2019). Despite its ubiquitous use, both instructors and students have largely taken note-taking for granted. However, developments in the higher education scene, such as the expansion of commercial note taking services, have led instructors to question the usefulness of note-taking in facilitating learning and their own participation in the process in recent years. Furthermore, note-taking research shows that taking notes in class and reviewing those notes (either in class or subsequently) improves student learning. Not surprisingly, the majority of research demonstrates that students recall more lecture content if they record it in their notes. Students who take notes outperform students who do not take notes on both immediate and delayed assessments of recall and synthesis.

Looyeh et al. (2017) inferred from the data provided

that some students who take notes while studying can better understand and remember learning material.

Oladeni and Bimbo (2017) investigated the relationship between the variables of the study of secondary school students in Mathematics. The findings showed that note-taking, student's use of the library, and time allocation have a significant relationship with the student's academic performance in Mathematics. It means that these factors can help the students improve the academic performance of their studies.

Furthermore, Oriogu and Subair (2017) stated that study habits are essential to the student's academic performance. Their study revealed that reading habits have a significant effect on the academic performance of students.

Memory/Remembering

Short-term and long-term memories are the classifications of memory. The ability to hold small amounts of information in the brain is known as short-term memory. Long-term memory is a kind of memory in which an individual retain information from the past in his brain. Each of these kinds of memories is highly significant to us, and each can be lost for a variety of reasons. Converting a short-term memory to a long-term memory necessitates brain modifications that safeguard the memory from interference from competing inputs or disruption from injury or disease. Consolidation refers to the time-dependent process by which encounters become permanent records in human memory (Anand et al., 2021).

What makes writing so effective? "Writing about content material facilitates learning by consolidating information in long-term memory," Graham and his colleagues say, referring to a phenomenon known as the retrieval effect (Terada, 2021). Writing on a subject also encourages pupils to think about it more deeply. Answering multiple-choice or short-answer questions may aid with factual memory, but putting thoughts on paper enables students to analyze diverse ideas, weighing the value of each one and considering the order in which they should be presented, according to Graham and his colleagues. Students may develop new connections between ideas as a result of this, connections they may not have formed while first acquiring the subject.

Concentration

Unsurprisingly, how long a pupil can concentrate is highly individual. One thing neuroscientists do agree

on is that the average attention span of children will increase as they grow older. Many experts claim that the average length of a child's attention can be estimated using the following simple formula: Age 2-5 minutes = Average Attention Span (TeachStarter, 2022).

The role of attention is essentially undeniable in student's learning process (Le, V., 2021). The concentration of learning is the same as student achievement students with good learning concentration have an easier time understanding the material, which certainly has an impact on increasing their learning achievement (Murthi, 2018). In addition, the student learning outcomes can be influenced by the concentration of study; students who have learned good concentration generally obtain good learning outcomes (Murniarti, 2020). Therefore, it takes effort to increase the concentration of student learning so that the learning process can be effective, efficient, and meaningful.

Taking an Assessment

The Department of Education (DepEd) has authorized the conduct of a rapid assessment for learning recovery in the school year 2021-2022, which will cover students in public and private schools, to detect learning gaps and devise suitable treatments. Education Secretary Leonor Briones signed DepEd Order No. 27, s. 2022 highlighted the rapid assessment process, which will also act as a precursor to the baseline system evaluation in 2024.

Assessment as learning, a sort of assessment in which students evaluate their learning process and result, is a valuable technique to enhance students' metacognitive skills because students may assist themselves in monitoring their learning progress (Jax, Ahn & Lin-Siegler, 2019).

According to Ebele and Olofu (2017), a student's performance is determined by how he approaches his education. While some students can breeze through school with little effort, the majority of successful students achieve their success through the development and application of effective study habits. Thus, study habits have a significant impact on student's academic performance. If students at all levels, instructors, administrators, parents, and the government continue to undermine students' awful performance in both internal and external examinations, the trend and threat of students' abysmal performance in both internal and external examinations will continue to grow and become more



destructive and alarming.

Technological Knowledge

The usage of technology is an essential aspect of our daily lives. Students in public schools are considered digital natives and have grown accustomed to always being linked to technology (Harrell and Bynum, 2018).

As we enter the high technology millennium, students and the next generation cope with society's and education's requirements and trends. They are constantly using technology in their daily lives, such as mobile phones, laptop computers, and the like (Aumentado, 2021).

According to him, entering the high technology millennium, students and the next generation grapple with societal and educational requirements and trends. They are constantly using technology in their daily lives, such as mobile phones, laptop computers, and the like. Technology is becoming an integral element of the teaching and learning process, with students relying on it. Furthermore, to participate in the global economy of the twenty-first century, pupils must be prepared to use technology. As cited by Savage and Brown in the study of Harrell and Bynum (2018), technology is vital for life skills in the workplace; technologically aware teachers and students have a better chance of acquiring a job and excelling in their career pathways. As a result, for learning to be relevant, we must integrate technology in the classroom setting and during instruction, which is a challenging assignment for us as teachers.

The introduction of technology in teaching has been reported as having positive effects on student's engagement, motivation, and achievements, as well as on teacher's teaching methods (Azmat et al., 2020). Educational technology has been described as an 'intellectual and social amplifier' which can help make "good" schools better but also increase problems at low achieving schools (Islam and Grönlund, 2016).

There are two methods most typically used to assess teachers' knowledge and skills in using technology in the classroom: self-reporting and performance-analysis of teaching-related activities (Willermark, 2018). In addition to these methods, tests can be used to assess teachers' knowledge (Maderick et al., 2016). Educational technology has made it necessary for instructors to acquire technical capabilities (Huma, 2013). Furthermore, teachers must employ technology in their classrooms in addition to their topic and pedagogical skills (Johnson et al., 2014). Educational technology has made it necessary for instructors to

acquire technical capabilities (Huma, 2013).

Learning Environment

The learning environment is a synthesis of human actions and material systems, much as ecology is a synthesis of living creatures and their physical surroundings (Balog, 2018). Modern learners deserve learning environments that satisfy their individual and collective needs. To tackle this challenge, educational leaders must create physically and culturally empowering and engaging classrooms (Orlu, 2013).

The school's physical environment demonstrates the importance of safe, clean, and comfortable settings in creating a positive school climate for students to learn. (National Center on Safe Supportive Learning Environment Website, 2022).

Learning environments differ from one another, with each having its own set of characteristics. Learning environments can be learner-centered, knowledge-centered, assessment-centered, or community-centered, according to study.com (2018). Learner-centered environments are intended to promote active knowledge development by and for learners (Federation University, 2018). Knowledge-centered learning environments enable students to conduct in-depth analyses of large ideas through productive learning activities. Assessment-centered learning settings offer frequent, continuing, and varied assessment opportunities, including revision and self and peer assessment (Alvaro, 2010). Collaboration, meaning negotiation, respect for diverse viewpoints on which knowledge is created, and links to the local community and culture are valued in community-centered environments (Raccoon Gang, 2018).

Shamaki (2015) conducted a study to determine the influence of learning environment on students' academic achievement at the senior secondary school level in Yobe State, Nigeria and found a significant difference between the mean performance of students taught in an ideal learning environment and that of students taught in a dull learning environment. Adamu (2015) examined the impact of the learning environment on the Performance of Students in public secondary schools in Taraba State, Nigeria and the findings revealed a significant difference in the performances of the two groups (Experimental and Control) implying that a classroom building, class with fine furniture; class with small class population and the use of instructional materials has a positive impact on



the performance of students in junior Secondary schools. In a related development, Mudassir and Norsuhaily (2015) conducted a study to examine how the school environment influences student's academic performance in selected secondary schools within Kuala Terengganu. The result of the study indicated that students from a school with adequate facilities, good teachers and a favourable environment perform better than those from schools with fewer facilities, unqualified teachers, and a less enabling environment.

Duruji, Azuh, and Oviasogie (2014) conducted another study to investigate the impact of the learning environment on students' performance in external examinations in secondary schools in Ota, Nigeria, taking into account factors such as school facilities, class size, school location, and school plant planning, aesthetics, maintenance culture, sanitation, and conveniences. According to the study, "the state of the learning environment and the quality of infrastructure, as well as the extent, to which they are maintained, has a strong bearing on academic performance among students." Furthermore, Ezike (2018) evaluated the classroom atmosphere and students' academic engagement as predictors of achievement in Senior Secondary Chemistry students in Ibadan, Oyo State, Nigeria. The findings revealed substantial correlations between classroom environment and academic accomplishment, whereas the combined impact of the classroom environment and academic achievement was significant. Gilavand (2016) discovered that environmental factors (appropriate noise, lighting of educational environment, and schools' open space) have an impact on the learning and academic achievement of elementary students in a study whose goal is to investigate the impact of environmental factors (school's open space, noise, lighting, and paintings in educational institutions) on learning and academic achievement of elementary students. In a study titled the effect of environmental factors in teaching and learning in primary and secondary schools in Edo State, Nigeria, Eimuhi and Ogedegbe (2016) examined environmental factors to determine the outcome of teaching and learning at all times and in all places and concluded that the more enriched the learning environments are, the more excellent and more widespread the benefits for academic performance and other student outcomes. Similarly, a study was conducted by Odeh, Oguche and Ivagher (2015) that concludes whose primary goal was to evaluate the impact of school environment on the academic achievement of secondary school students. The study's findings reveal that school atmosphere, discipline, and physical facilities have a substantial influence on secondary school students' academic

progress in Benue State, Nigeria. This implies that schools that fail to provide the necessary learning facilities and create a conducive atmosphere for teaching and learning may hardly put in the best in their students especially in the area of academic achievement.

Waldman (2016) noticed that children must feel safe, both physically and mentally, before they can perform academically, and that to establish a safe learning environment, students must feel welcomed, encouraged, and respected. Personalizing learning assists students in acquiring abilities such as critical thinking, utilizing knowledge and information to solve complicated problems, working together, effectively communicating, understanding how to study, and creating academic mindsets that would dramatically boost student engagement (Raccoon Gang, 2018). Students must also feel linked to their teachers, staff, and peers. Schools can foster these bonds by emphasizing kids' social and emotional skills. (SEL). Students must also feel supported by all people involved in their learning experience, such as instructors, classmates, administrators, family, and community members, to achieve greater academic success (Waldman, 2016). Students' academic, emotional, and social performance in school is all dependent on productive learning settings. A favorable learning environment does not happen by itself or by chance. They should be developed through purposeful methods such as positively interacting with pupils, demonstrating good behaviors, and enhancing learning activities in the learning environment (Becton, 2017).

Teaching Approaches

The Merriam-Webster Dictionary (2016) defines teaching as imparting or providing knowledge or skills to another. Thus, it is the act, occupation, or profession of a teacher. It encompasses both instructions in procedures, a process to guide students to the information they will need, and challenging them to engage in thinking about concepts they construct in their minds. All of these are needed to teach students to become fully functioning individuals with good thinking capacities.

A teaching approach is a method of teaching that offers a method that promotes good performance (Hasanova, 2021). Thus, an approach is a way of looking at teaching and learning, according to the British Council (2015). A theoretical concept of language and how it can be learned underpins any language education approach. Methods, the way of teaching something that uses classroom activities or

procedures to assist learners in learning, is born from an approach. Cognitive, behaviorist, and constructivist approaches to learning are examples of teaching approaches.

Learning styles are an essential component of how the teacher will exhibit the student's knowledge so they can readily understand what is being taught (Busilaoco et al., 2014). Rezaeinejad (2015) discovered that knowing the student's learning styles will help the teacher deliver the lesson so that students can cope easily, make diverse teaching strategies, and lead to their educational achievement in a study on Learning Styles and Its Relationship with Educational Achievement among Iranian High School Students.

Student-centered is one of the ways that promote greater stability between the teacher and the student, both of whom play an important role in the learning process. While teachers retain authority, they serve more as facilitators, coaching pupils and assisting them in their learning (Lathan, 2021).

Moreover, student-centered approaches, which are more effective, are more encouraged because they embrace the concept of discovery learning (Brindley, 2015). Ogide (2017) states that in tertiary institutions, teachers use mainly the lecture method, which is a teacher-centered method and the implication is that learners are passive and learning tends to be superficial. Daluba (2013) opined that for better performance of students, the use of activity-stimulating and student-centered approach like the demonstration method instead of depending on the conventional approach like the lecture method need to be embraced.

Garcia (2017) stressed that several factors affect the pupil's academic performance in Mathematics. Regarding school factors, the relationship between the teacher and the students, and how math teachers encourage their students to learn their subject. Furthermore, it is important for students to feel that their teacher is knowledgeable enough to teach this kind of lesson. The teacher's abilities and proficiency also affect the performance of the students in their studies. Their expertise in teaching mathematics and knowledge in the different mathematics concepts are substantial.

As cited by Kele (2018), the way teachers conduct themselves in class, their teaching methods and strategies, and the conduciveness of the learning environment, all count toward the development of students' learning. If teachers show positive attitudes toward mathematics, then students will be more likely

to develop positive attitudes toward their learning. This study concludes that teachers must take a bold stand to motivate students in the development of their mathematical understanding.

The teacher's personality as an individual is a significant aspect in the learning environment. They are essential in establishing an excellent teaching-learning environment that will make the instructional process simple, enthusiastically adaptable, and beneficial (Usman, 2016). The way his personality interacts with the personalities of the students influences the type of behavior that emerges from the learning scenario (Brown, 2015).

Haris and Osman (2015) noted that 21st-century students require various teaching methods and techniques to keep them interested. Many students have access to multiple forms of media, and simple conventional ways are not enough to keep today's students interested. Increased student interest has been shown in research when teachers include multiple activity types in their lessons: whole group, small group, data gathering, and discussion. If activities or methodologies are not cognitively appropriate, the students will lose interest. When designing and developing programs, it is important to remember the cognitive abilities of the participants and consider the length as well as the type of activity.

Moreover, grouping students for learning tasks is an essential organizational practice that can give opportunities for students to articulate thinking and understanding. Social-constructivists believe that learning occurs through social interactions (Kele, 2018). In this view students actively share ideas with their peers, thus promoting the development of mathematical knowledge. Students communicating with teachers and peers about their mathematical ideas is a major component of classroom discourse and a vehicle for increasing student learning.

Communication Skills

In the teaching profession, excellent communication is regarded as a valuable tool. Kiadese (2011), as cited by Florence et al. (2021), believes that effective teaching needs strong communication, classroom management, information upgrading, and personality maintenance. Furthermore, Mayhew (2018) believes that a teacher's capacity to communicate efficiently with students, parents, and co-workers is critical to their performance. Also, Sword (2020) supported the view that the better your communication skills, the more you perform designated tasks effectively. When



there is a free flow of communication between the teachers and students, between the principal and teachers, and between the teachers and colleagues, productivity will be enhanced. This finding supported the finding of Alamgir et al. (2021) that good communication skills among teachers are the basic need for the academic success of students, and professional success in life.

Furthermore, according to Khan A. et al. (2017), strong communication skills among teachers are an essential requirement for student academic success and professional success in life. More instructions are given to students orally in the classroom by the teacher. Students may struggle to learn and advance academically if their teacher has poor communication skills. Students must grasp what is good and wrong, and this is entirely dependent on the communication abilities of teachers that they employ in the classroom. Furthermore, good communication reduces the possibility of harsh feelings during the educational process. During the lecture, the learner must pay close attention to their teacher to learn. Khan et al. (2017) advised teachers to communicate in a straightforward and intelligible manner.

The perceived ineffectiveness of some teachers in Nigerian secondary schools seems to be a result of poor communication skills. Teachers who are unskilful communicators tend to have problems with administrators when making a request. Supported that when making a request, teachers who are skilled communicators have a better chance of being heard by administrators. Effective communicators state their requests succinctly (Freddie, 2018).

Freddie (2018) supported that when making a request, teachers who are skilled communicators have a better chance of being heard by administrators. Effective communicators state their request succinctly. This was supported by Nnamani (2016), who said that teachers who pay attention to their students' queries and concerns are better able to satisfy their particular requirements and alter their lessons as needed.

The transmission of a message that involves a shared understanding between the settings in which the conversation takes place is described as a communication skill. The communication skills of teachers are crucial in the delivery of education to students. A teacher's ability to communicate effectively is critical in transmitting education, classroom management, and contact with pupils in the classroom (Bella, 2013).

Sotco (2014), effective communication entails

selecting the optimal communication channel for a given task, having the technical skills to utilize the channel effectively, presenting information in a way that is appropriate for the target audience, and being able to comprehend messages and responses from others.

As cited by Raja & Nagasubramani (2018), the use of modern technology in education increases the interaction and interest of the learners. He believes that the use of technology further heightens the interests of the learners when it comes to learning. In addition, he also mentions that the transfer of information becomes more accessible and more convenient, resulting in a more effective learning experience.

Methodology

This study employed quantitative research utilizing a descriptive, evaluative correlational design. This study also used a descriptive design because the researcher wished to describe the study habits (time management, learning motivation, reading and note-taking, memory/remembering, concentration, and taking an assessment), technological knowledge, learning environment, teaching approaches, and communication skills of Grade 10 learners that contribute to the improvement of their academic performance. These were described in terms of using a 4-point Likert Scale. Furthermore, the researcher described the academic performance of the respondents by using their grades during the second quarter as outstanding, very satisfactory, satisfactory, fairly satisfactory, and did not meet expectation.

On the other hand, the study employed a correlational design in order to determine the significant relationship of the associated factors to the academic performance of the Grade 10 learners in Mathematics from secondary schools of Pitogo District

Participants

Total of Grade 10 Students and Number of Qualifiers based on the Criteria

<i>Name of School</i>	<i>Population</i>	<i>Sample</i>
Amontay NHS	170	83
Cabulihan NHS	39	19
Pitogo Community HS	162	80
Sampaloc NHS	31	15
TOTAL	402	197

The table shows that there are 402 Grade 10 learners who are enrolled for the school year 2022-2023 aged from 15 to 17 years old, and there are only 197 qualified learners who passed based on the criteria which would serve as the respondents of the study.

A systematic sampling technique was applied in this study for the effective choice of respondents based on the following criteria:

- Grade 10 learners who are enrolled this school year in Pitogo District
- The range of ages is from 15 to 17 years old.

Instruments of the Study

The researcher utilized a researcher-made questionnaire focusing on various factors, namely study habits which are composed of six indicators: (1) time management; (2) learning motivation; (3) reading and note-taking; (4) memory/remembering; (5) concentration; and (6) taking an assessment, and learning domains which are composed of four indicators: technological knowledge, learning environment, teaching approaches and communication skills. Every part has five statements which were answered using a 4-point Likert Scale.

A data gathering form is also used to accumulate the second quarter grades of the Grade 10 students.

In order to get valid responses from the respondents, the researcher asked the experts to validate the research instrument. The self-constructed research questionnaire was administered to thirty (30) non-respondents and then tested using Cronbach Alpha. The computed alpha of the pre-survey to 30 non-respondents to validate the reliability of the questions is 0.95, which is interpreted as *excellent*. The results were reported to the research adviser and statistician for further actions, if any. The principles of reliability and validity were used to assess the quality of the research.

Procedures

The researcher created a research questionnaire. The questionnaire was presented to an expert panel for review and content alignment. These experts' comments and suggestions were considered and incorporated into the research questionnaire. After seeking the approval of the experts, the self-made questionnaire was tested for validity and reliability. The questionnaire was administered to thirty (30) non-respondents and then tested using Cronbach Alpha.

Moreover, the researcher wrote a letter and sought approval from the Schools Division Superintendent (SDS) to perform this study before administering the research instrument. Once approved, the researcher sought approval from the district supervisor, followed by the approval of the school heads.

Then, in line with the classroom schedules, the qualified respondents were approached, and after giving them an explanation of the study's objective, copies of the questionnaires were given to them. The questionnaires were collected by the researcher after completion. The data gathered were analyzed using IBM SPSS Statistics version 26, which served as the basis for drawing some conclusions and recommendations according to the problems addressed in this research study.

Ethical Considerations

During the study period, the ethical principles were established ensuring the dignity and well-being of the participants. Furthermore, research data will be kept confidential throughout the research process.

Results

This section presents the findings according to the study's research questions. A test of normality using the Shapiro Wilk W-Test was performed between identified factors and the academic performance of the Grade 10 learners, resulting in a p-value less than 0.05 level of significance, which is described as *not normal*. Thus, non-parametric statistics were applied for analysis.

The researcher utilized the arithmetic mean to determine the associated factors, namely time management, learning motivation, reading and note-taking, memory/remembering, concentration, taking an assessment, technological knowledge, learning environment, teaching approaches, and communication skills. Meanwhile, percentage was used to identify whether respondents belong to outstanding, very satisfactory, satisfactory, fairly satisfactory, or did not meet expectations that are based on the DepEd School Form 9. Furthermore, Spearman's rank-order correlation was used to determine whether these identified factors have a significant association with the academic performance of Grade 10 students enrolled in the school year 2022-2023. Lastly, the analysis in this research used multiple linear regression analysis that has a function to explain whether there is an effect between these variables, namely the variables



of study habits (x_1), technological knowledge (x_2) learning environment (x_3), teaching approaches (x_4) and communication skills (x_5) on student's academic performance (y).

Table 1. Summary of the Study as a Factor Influencing the Academic Performance of Grade 10 Students

Factors	Mean
Time Management	2.77
Learning Motivation	2.94
Reading and Note-taking	2.81
Memory/Remembering	2.81
Concentration	2.85
Taking an Assessment	2.84
Composite Mean	2.84

Table 2. Summary of the Factors Associated to the Academic Performance of Grade 10 Students.

Factors	Mean
Technological Knowledge	2.73
Learning Environment	2.82
Teaching Approaches	3.35
Communication Skills	3.02
Composite Mean	2.98

Table 3. Level of Academic Performance in Mathematics of the Grade 10 Junior High School Learners in the Second Quarter

Grading Scale	Frequency	Percentage
Below 75%	7	3.55
75-79	69	35.03
80-84	74	37.56
85-89	33	16.75
90-100	14	7.11
Total	197	100.00
Mean	81.14	
SD	5.21	

Table 4.1. Significant Association Between the Identified Factors to the Academic Performance of the Grade 10 Learners in Mathematics in Terms of Study Habits

Indicators	Academic Performance		
	Correlation Coefficient	Interpretation	P-Value
Time Management	0.345	Moderate Positive Correlation	0.000
Learning Motivation	0.394	Moderate Positive Correlation	0.000
Reading and Note Taking	0.318	Moderate Positive Correlation	0.000
Memory/Remembering	0.330	Moderate Positive Correlation	0.000
Taking an Assessment	0.392	Moderate Positive Correlation	0.000

Table 4.2. Significant Association Between the Identified Factors to the Academic Performance of the Grade 10 Learners in Mathematics

Indicators	Academic Performance		
	Correlation Coefficient	Interpretation	P-Value
Technological Knowledge	0.330	Moderate Positive Correlation	0.000
Learning Environment	0.365	Moderate Positive Correlation	0.000
Teaching Approaches	0.382	Moderate Positive Correlation	0.000
Communication Skills	0.395	Moderate Positive Correlation	0.000

Table 5.1. Regression Analysis on the Significant Effect of the Identified Factors to the Academic Performance of the Grade 10 Learners Mathematics in Terms of Study Habits

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
Time Management	69.575	2.056		33.484	.000
Learning Motivation	1.414	.983	.160	1.439	.152
Reading Note Taking	.560	.970	.065	.577	.584
Memory	.383	.985	.044	.389	.698
Concentration	.035	1.113	.004	.031	.975
Taking an Assessment	1.123	.909	.138	1.236	.218

Table 5.2. Regression Analysis on the Significant Effect of the Identified Factors to the Academic Performance of the Grade 10 Learners Mathematics

Model	Coefficients		Standardized Coefficients		
	B	Std. Error	Betas	T	Sig.
Constant	66.685	2.244		29.723	.000
Tech_Knowledge	.397	.724	.044	.548	.584
Learning Environment	1.273	.761	.136	1.673	.096
Teaching Approaches	1.443	.723	.164	1.994	.048
Communication Skills	1.640	.819	.192	2.002	.047

Discussion

The Identified Factors affecting the Academic Performance of Grade 10 Students in terms of Study Habits

The composite means of the identified factors such as time management, learning motivation, reading and note-taking, memory/remembering, concentration, and taking an assessment affecting the academic performance of grade 10 students were 2.77, 2.94, 2.81, 2.81, 2.85, and 2.84, respectively. The overall composite mean of these factors was 2.84, which is described as being *practiced to a moderate extent*. In addition, time management has the lowest composite mean, 2.77, and is described as being *practiced to a moderate extent*.

The Associated Factors affecting the Academic Performance of Grade 10 Students

The composite means of the associated factors such as technological knowledge, learning environment, teaching approaches, and communication skills affecting the academic performance of grade 10 students were 2.73, 2.82, 3.35, and 3.02, respectively. The overall composite mean of these factors was 2.98, which is described as “*agree*”. In addition, technological knowledge has the lowest composite mean, 2.73, described as “*agree*”.

Academic Performance of the Grade 10 Students

The academic performance of the students refers to the second quarter grades of the respondents. Majority of the students' grades is ranging from 80-84 which is 37.56% of the respondents. It is followed by those sixty-nine (69) students who ranges from 75-79 which is 35.03% of the sample size. Moreover, there are thirty-three (33) students which is 16.75% ranging from 85-89 as their grades. There are fourteen (14) students who are considered outstanding which is 7.11% of the respondents. Meanwhile, there are seven (7) students who did not meet the expectations which

is 3.55% of the respondents.

Significant Association between the Identified Factors in the Academic Performance of the Grade 10 Learners in Mathematics

Based on Tables 4.2 and 4.3, there is a positive correlation coefficient among the identified factors in relation to the academic performance of the Grade 10 learners in mathematics in terms of their study habits (time management, learning motivation, reading and note-taking, memory/remembering, concentration, and taking an assessment), technological knowledge, learning environment, teaching approaches and communication skills.

Significant Effect of the Associated Factors on Grade 10 Students' Academic Performance

The *p-value* of the factors such as time management, learning motivation, reading and note-taking, memory/remembering, concentration, taking an assessment, technological knowledge, learning environment, teaching approaches, and communication skills which are all associated to the academic performance in mathematics of the grade 10 students were 0.497, 0.152, 0.564, 0.698, 0.975, 0.218, 0.584, 0.096, 0.048 and 0.047, respectively.

Developed Learning Enrichment Program to Improve the Associated Factors and the Academic Performance of Grade 10 Students in Mathematics

The developed learning enrichment program is for students needing moderate to intensive assistance in building strong study habits and other associated factors to improve their academic performance in mathematics. This program is designed to optimize students' learning styles and strategies in line with varied and collaborative teaching approaches and strategies. Moreover, one of the goals of this program is to establish a support group composed of mathematics enthusiasts to help the mathematically challenged students.

The program is applicable for all the quarters/periods in the whole school year. The participants in this enrichment program are the mathematics teachers at the secondary level and Grade 10 students. On the other hand, this can be adopted at other grade levels since the same principles and activities may be applied in like contexts of learning.



Conclusion

The following are the conclusions made by the researcher based on the findings of the study:

1. After conducting extensive research and analyzing the data, it is evident that high school students are most familiar with the study habits that can improve their academic performance. While this may be concerning for some, it is important to note that developing effective study habits is a skill that can be learned and improve upon over time. This implies that even if the students do not get any reward, intrinsically motivated they tend to have deeper knowledge in Mathematics. Meanwhile, the results connote that most of the students in Pitogo District have poor time management wherein they do not put extra time to thoroughly study the subject matter and the social activities and their studies are not prioritized. Most students are quite inefficient in organizing and planning tasks by making a to-do list which is to be completed on a priority bases. By tapping into this resource, educators and parents alike can gain valuable insights into how to help students achieve their full potential. It is clear that working in collaboration with students to enhance their academic skills is key to success.

2. It is evident that high school students have a clear understanding of the factors that can improve their academic performance. The students understand the importance of tailoring teaching approaches and creating a conducive learning environment that caters to individual student needs. Effective communication skills and technological knowledge also play a significant role in enhancing academic success. This also implies that teachers should serve as motivation and inspiration to the students to thoroughly learn the lessons in Mathematics. They should show willingness to offer help and advice and must provide engaging and relevant activities and resources. Therefore, it is imperative to consider student feedback and implement strategies that align with their preferences and expectations. Overall, prioritizing student satisfaction and engagement is key to achieving academic excellence.

3. According to the findings, most pupils' academic performance ranges between 75 and 79 and 80 and 84. This shows that educators should provide more support and resources to help pupils earn higher grades. Furthermore, the majority of the respondents in this survey can be classified as poor achievers who are not completely informed about the various study habits

and other known elements that are related to academic achievement in Mathematics. As a result, educators must offer students with the tools and resources they need to develop and sustain healthy study habits that would contribute to long-term academic achievement.

4. It is clear that there is a significant relationship between the academic performance of Grade 10 students in Mathematics and all identified factors such as study habits in terms of time management, learning motivation, reading and note-taking, memory/remembering, concentration, taking an assessment, technological knowledge, learning environment, teaching approaches, and communication skills. This basically indicates that increasing the practice of study habits would lead to higher academic accomplishment among high school pupils. Thus, the study concluded that if students keep satisfactory and proper study habits, their academic performance would undoubtedly increase. Teaching practices are critical in molding students' learning experiences, while the learning environment provides a suitable environment for optimal learning. Furthermore, communication skills are essential in facilitating effective interaction between teachers and learners, which ultimately impacts academic achievement. Lastly, technological knowledge is becoming increasingly important in modern-day education and can positively affect academic performance. Therefore, it is imperative that educators pay close attention to these factors to ensure that students attain their full potential.

5. The findings suggest that teaching strategies and communication skills are the most important factors that significantly affect the academic performance, particularly for low-achieving students. It is clear that study habits, learning environment and technological knowledge do not contribute significantly to their academic success. As educators, it is important to prioritize these two key areas in our teaching practices to ensure that all students have the opportunity to excel academically. By focusing on effective teaching strategies and communication skills, teachers can help students reach their full potential and achieve success in their academic pursuits. Thus, teachers must provide more engaging and relevant activities and resources that students would be engaged to participate in every lesson in Mathematics.

6. The Learning Enrichment Program (LEP) in Mathematics, in connection with these associated factors, is appropriate to monitor the academic performance of Grade 10 students. This program is focused on building strong study habits and strengthening other associated factors affecting the

academic performance of the students in mathematics. It is named “*Study Habit Primer: A Guide to Building Strong Practices on Associated Factors*” in which objectives, strategies and activities are planned and prepared. Implementing this program would benefit teachers and students by improving their academic performance.

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