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Behavioral risk factors among mathematics education major students

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Abstract

A student's academic performance is directly related to their level of education, which plays a significant role in the personal, social, and economic development of the nation. The number of senior high school graduates in the country who take education as a program in higher education serves a silver lining to the quality of education in the country. Future teachers who are determined to join the teaching force, especially mathematics education. The abstract nature of mathematics education makes it a challenging program to take because it requires students to have a strong understanding of difficult concepts, the ability to reason logically, and the ability to solve problems. The progressive structure of the curriculum requires continuous comprehension because it builds on foundational knowledge of the subject matter. The paper is aimed at addressing the dropout rate of mathematics education major students as they progress to more complex content subjects in their curriculum. Using a descriptive correlational design, this paper revealed that the mathematics major students perform well in academics. They also show a high level of perseverance and possess a learning mindset. They are also able to identify learning strategies and socialize with their peers despite the complexity of the concepts that they study in their curriculum. Results also reveal that learning management is among the factors of drop-out from the program. An action plan will be developed from these results.

Keywords: Mathematics education; Perseverance; Behavioral risk factors; Drop-out

1. Introduction

Students who major in mathematics education study the theory, practice, and pedagogy of teaching mathematics at a variety of educational levels. Students enrolled in this major take classes that combine mathematical content with educational methods, allowing them to investigate curriculum design, instructional strategies, and assessment techniques alongside the mathematical content. As a result, they acquire the skills necessary to effectively communicate mathematical concepts and adapt instructional strategies to accommodate a variety of learning styles. Undergraduate students who are majoring in mathematics education frequently gain classroom experience through internships or student teaching, which helps them hone their ability to cultivate critical thinking and problem-solving skills in their students. The majority of graduates go on to pursue careers in mathematics education, either as teachers, curriculum developers, or educational consultants, all of which contribute to the improvement of mathematics education in local schools. Personal traits such as perseverance, academic mindset, learning strategies, and social skills all play significant roles in the formation of these individuals' behavioral patterns and, as a result, in the influence that these patterns have on academic performance.

A student's academic success can be influenced by their level of perseverance, which is defined as the capacity to persevere in the face of challenges. Studies show that people with higher grit and perseverance have better outcomes in a variety of areas, including academic achievements⁽¹⁾. A mindset that is resilient encourages individuals to view challenges as opportunities for growth, which in turn helps to cultivate a positive attitude toward academics. On the other hand, having a fixed mindset can cause one to run away from difficult situations, which can restrict one's academic

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potential. The ability to learn effectively is a critical factor in determining academic achievement. Acquiring efficient learning habits, the ability to manage one's time effectively, and the ability to process information are all important factors. Procrastination and a lack of organization are two examples of poor strategies that threaten academic achievement. On the other hand, poor strategies pose significant risks. Having strong social skills is essential for success in the academic setting. In addition to having an effect on the learning experience, collaboration, communication, and interpersonal relationships also have an effect on overall success. Students whose social skills are well developed typically perform exceptionally well in group activities, projects, and interactions with their peers, which in turn improves their academic performance.

Over the past years it has been evident how the change in academic landscape altered students' behavioral patterns. The easy access to information through technological advances has benefitted students in their academic success. However, reports on exposure to social media revealed that social media overload ⁽²⁾ is an acknowledged depreciating factor towards learning. Students are spending a significant amount of time utilizing technology and the internet in order to spend their free time and/or participate in online educational programs during this pandemic. According to the findings of a study that was carried out in a nation in Asia prior to the pandemic, the majority of young people who used the internet did so for the purpose of playing online games, which led to them engaging in behaviors that were classified as addictive toward the internet.⁽³⁾ Additionally, the pandemic that happened leading to shift from face-to-face set-up to online learning affected not only how learning is delivered but most importantly how students behaved as they isolate from their social group and peers from schools. These are evidently observed in classrooms when the pandemic was declared finally over, and students are required to go back to in-person classes. These became the springboard of this study.

The only way to grow and develop, both as individuals and as a nation, is through education, which is a major vehicle for the transformation of the country. With regard to the significance of education, policymakers and heads of institutes, in addition to educators, had a broad perspective. On the other hand, in light of the current pandemic environment, there were a few students and parents who had relative priorities that were different from one another.⁽⁴⁾ This study intends to investigate how the behavioral risk factors (perseverance, academic mindset, learning strategies, and social skills) contribute to the academic performance of mathematics majors. The paper is aimed at addressing the dropout rate of mathematics education major students as they progress to more complex content subjects in their curriculum.

2. Material and methods

This study employed descriptive correlational research since it does not involve manipulation of the situation, circumstances or experience of the respondents. It simply identifies co-movements of variables and is helpful in identifying the relation of one variable to another. Correlational research is a descriptive type of research which aims to describe what exists at the moment (conditions, practices, processes, structures, etc.) and determine the nature, degree and direction of relationships between variables⁵. Respondents were selected through convenience sampling. The main instrument used was a survey questionnaire crafted by the researcher to achieve the main objectives of the study. It contained behavioral risk factors that affect the academic performance of mathematics education students, GPA, and open-ended questions. An interview was also conducted by the researcher. The data collected were further analyzed through different statistical tools.

3. Results and discussion

This paper sought to identify among others the academic performance of the mathematics major in terms of their General Point Average (GPA). The grades that a student receives are a quantitative measurement of their academic performance. They reflect the student's ability to meet educational standards as well as their level of subject matter mastery. In addition to assisting with the selection of students for employment and university admissions, they offer a standardized method of evaluating and comparing students. Additional feedback is provided to both students and teachers in the form of grades, which indicate areas of strength and weakness. Relying solely on grades may oversimplify the multifaceted nature of learning, ignoring aspects such as creativity and critical thinking.

As can be seen in Figure 1, the respondents belong to a group that are considerably above the average in terms of their grade point average (GPA). While grades are useful for accountability and goal-setting, they may also create an oversimplification of the learning process. For a complete comprehension of academic accomplishment, it is necessary to find a middle ground between evaluation and education that takes into account the whole curriculum. This study also zooms into the self-assessment of the respondents on their values like perseverance and academic mindset as well as their learning strategies and social skills to determine their proneness to risks.

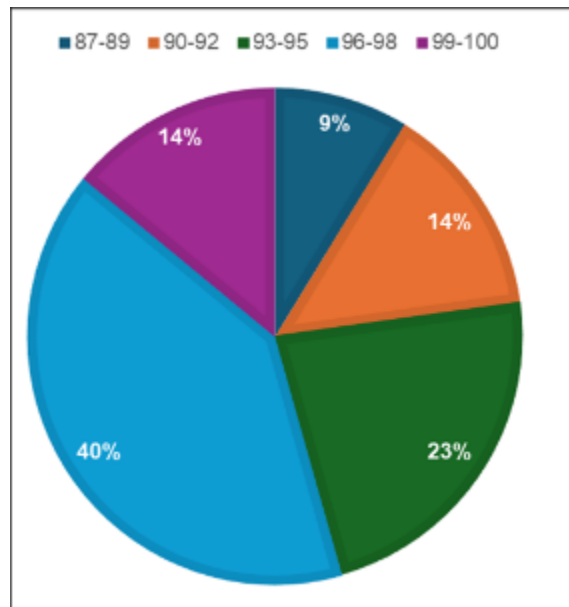


Figure 1 Grade Point Average (GPA)

Table 1 Behavioral Risk Factors

	Perseverance	Academic Mindset	Learning Strategies	Social Skills
Mean	3.528 (Often)	3.147(Often)	3.164 (Often)	3.043 (Often)
Std. Deviation	0.427	0.575	0.427	0.554

Despite the fact that perseverance is frequently regarded as a positive trait, it can be a behavioral risk factor when it is displayed in unhealthy circumstances. A study conducted in 2021⁶ highlighted "grit" as a component of perseverance, highlighting the potential detriments associated with it. Excessive persistence in activities that are either unproductive or harmful, despite the obvious negative consequences, may result in burnout, stress-related issues, and a decline in well-being⁷. In order to maintain overall mental health, it is essential to strike a balance between adaptability and perseverance⁸. The level of perseverance based on the items of the survey to the participants indicate a high level of engagement with the activities showing such value traits are demonstrated "Often".

One of the most important behavioral risk factors that can have an effect on educational outcomes is academic mindset, which can be defined as an individual's beliefs and attitudes toward learning. Its significance is highlighted by studies that span the years 2020-2023. A growth mindset, in which individuals believe that their abilities can be developed through effort, is shown to have a significant impact on academic success⁹. On the other hand, according to Schleicher's findings, fixed mindsets are observed to be associated with performance anxiety and a diminished capacity for resilience when confronted with challenges¹⁰. With the academic performance of the respondents, it can be implied that such students have a mindset that is more inclined to growth. In addition, research also highlights the significance of the academic mindset in determining the learning behaviors and motivation experienced by students¹¹. The identification of mindset as a behavioral risk factor enables the development of targeted interventions that aim to cultivate positive attitudes, thereby improving overall academic achievement.

Studies have shown that certain learning strategies, such as procrastination and ineffective time management, can be considered behavioral risk factors that have an effect on academic achievement¹². According to research¹³, these behaviors hinder effective learning by reducing the amount of time spent studying and lack of engagement, which ultimately results in lower academic performance. Furthermore, inadequate learning strategies have the potential to contribute to stress and anxiety, which in turn can have a negative impact on mental well-being¹⁴. To foster positive learning outcomes, it is essential to recognize and address these behaviors among higher education students through peer counselling or school programs. Teachers must also put in effort to understand this generation of learners and how their learning strategies are different from previous generations.

The development of social skills, which are necessary for successful interactions with other people, is an important factor in both mental health and overall well-being. Research 2 sheds light on the impact that deficient social skills have as a behavioral risk factor. Deficient social skills have been linked to increased stress and mental health issues¹⁵. Developing strong social skills is essential for mitigating behavioral risks and fostering positive mental health outcomes in individuals across a variety of contexts, as demonstrated by the studies that were conducted. Having sources of motivation from family members, peers, support groups and significant others were also revealed by the respondents. Additionally, extracurricular activities are an essential component of a well-rounded education because they provide students with the opportunity to apply the knowledge they have gained in the classroom to real-world situations and serve as a means of reinforcing the lessons they have learned in the classroom. In organizations and clubs, that constitute essentially small groups where individuals are welcomed, a student can express themselves, polish their capabilities, experience a strong sense of communal ownership, and most importantly, gain the ability they need to become people-for-others¹⁶. Through these activities, not only is the academic performance boosted, but leadership skills are also developed. A study found that leadership training positively impacted academic performance, engagement, study patterns, learning attitudes, and problem-solving skills. The findings suggest that leadership training can improve academic and social skills¹⁷.

Table 2 Correlation of Variables

Variable		GPA	
1. Perseverance	Pearson's r	0.334	*
	p-value	0.010	
2. Academic Mindset	Pearson's r	0.088	
	p-value	0.513	
3. Learning Skills	Pearson's r	0.210	
	p-value	0.114	
4. Social Skills	Pearson's r	0.039	
	p-value	0.769	

* p < .05

Table 3 Participants' Source of Motivation to Persevere

Themes	Sample responses
Significant Others	<p><i>"My Family"</i></p> <p><i>"My dream for my family and paying back the sacrifices my parents have done."</i></p> <p><i>"...the people around me, my family who supports me in my studies, my professors that inspire me to be like them, and friends/classmates where we give each other positive insights."</i></p> <p><i>"My mother because she is the one who pay my tuition, and I dont want to break my promise to my parents."</i></p>
Improved Living Conditions	<p><i>para guminhawa sa hirap yung family ko po</i></p> <p><i>For the purpose of having a stable future</i></p> <p><i>Remembering my current situation and inner child dream.</i></p>
Self-fulfillment and advancement	<p><i>first if i love whst i am doing.</i></p> <p><i>my goals in life</i></p> <p><i>My future plan</i></p> <p><i>The thought that I need it in the long run.</i></p>

The correlation between the behavioral risk factor was also explored in this study vis-à-vis academic performance. As seen in table 2, the r value for perseverance is greater than 0.05, which means the correlation is positive, indicating a positive linear relationship between the two variables. This implies that as perseverance increases academic

performance tend to increase also. These findings are further elaborated in the qualitative responses of the students as summarized in Table 3.

Table 4 Reasons for Dropping Out

Themes	Sample responses
Financial Instability	Lack of parental support ft the financial Insufficient income to pay educational demands
Mental Health	stress and anxiety can mess with my motivation and focus, making my work not so great student have anxiety or depression Pressure Feel stress and seems like I'm drowning, and I can't focus to my studies.
Learning Management	Loss of confidence of the students. They were afraid to collaborate and participate to the class. The student's learning capabilities, and motivation in learning. it would be the constant pressure from different workloads and responsibilities maybe in a student's home, workplace, and of course in school. frequent absences from classes ack of focus, procrastination, and occasional lack of motivation students may have different duration of adopting in change Hard topics, professor/s that are not that clear with what they want us to do

It has been established that mathematics education has a challenging curriculum content and certain factors affect retention among students. The behavioral risk factors discussed in this paper are magnified with the actual responses of the respondents with most factors falling under learning management, which could be addressed by the educational institution by allowing for a more holistic approach in learning delivery. While it is acknowledged that the students themselves are above average in terms of academic performance, the fact that certain factors may lead to withdrawal or worse dropping out.

4. Conclusion

Based on the data gathered, it could be seen that an examination of the factors that contribute to performance or non-performance of students depends on the context that they are in. Although generally there are already identified factors, it is still imperative that researchers revisit these factors as the educational landscape changes over time with a new generation of learners. This paper also emphasizes that having a sense of direction for oneself especially with the intricacies of programs like mathematics education majors is essential for them to perform well academically, that despite setbacks they will persevere.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

There is no known conflict of interest in the conduct of this study.

Statement of ethical approval

This study obtained appropriate informed consent from the respondents.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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