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Exploring the Academic Challenges Encountered by Grade 12 Stem Students at Diplahan National High School: A Qualitative Study

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Abstract. *This study explored the academic challenges encountered by grade 12 STEM students. Hence, this study provided an analysis of the academic challenges that Grade 12 STEM (Science, Technology, Engineering, and Mathematics) students encountered and to analyze the experiences of the Grade 12 STEM (Science, Technology, Engineering and Mathematics) students. This study was a qualitative phenomenological study in which the researchers' employed questionnaires and interviews to investigate Grade 12 students' perceptions and experiences with STEM (Science, Technology, Engineering, and Mathematics) strands. The sample population of this research was composed of 10 out of the 40 students of the STEM (Science, Technology, Engineering, and Mathematics) strand from Diplahan National High School. The results implicated academic challenges encountered by grade 12 STEM (Science, Technology, Engineering, and Mathematics) students, but among those challenges, time management, heavy workload and academic stress stood out prominently. The findings of this study may then serve as a fundamental basis mainly for the aspiring STEM (Science, Technology, Engineering, and Mathematics).*

Keyword*: Science, Technology, Engineering, and Mathematics Strand, Academic Challenges*

Introduction

The letters in the acronym "STEM" stand for Science (S), Technology (T), Engineering (E), and Mathematics (M). Integrating the fields of Science, Technology, Engineering, and Mathematics is the goal of STEM education. It has grown in popularity in Turkey during the past ten years. But the regional and global literature demonstrates a propensity to incorporate a variety of fields into STEM (Carrell et.al, 2020).

The Department of Education (DepEd) introduced the senior high school component of the K-12 curriculum in the Philippines in the 2016-2017 academic year. The implementation of the K-12 curriculum was supported by Republic Act 10533, The Enhanced Basic Education Act of 2013, or House Bill 6643, proposed by Senator Loren Legarda in 2012 and passed by the House of Representatives by a vote of 190 to eight on May 15, 2013. Two more years were added to provide students enough time to prepare for their future ambitions and equip them with the essential information and abilities. The curriculum indicated above had four tracks, one of which was the academic track, which contained the Science, Technology, Engineering, and Mathematics (STEM) strand.

STEM (Science, Technology, Engineering, and Mathematics) education has drawn a lot of interest from around the world due to its capacity to spearhead creativity, critical thinking and problem-solving skills Dave (2024). The series of academic challenges often deter the students from such fields from producing the best results. In fact, students in the STEM fields usually experience problems including: inability to understand complicated mathematical concepts, the pressure of meeting high standards, lack of understanding of the application of knowledge in real life, inadequate knowledge of fundamental subjects, limited access to resources, appropriate time management, and the failure to apply theoretical knowledge to practical problems.

One of the main challenges is the challenging course curriculum and heavy workload associated with STEM programs; most students find it hard to cope with the pace at which coursework, assignments, and exams are done, leading to pressure and exhaustion. In addition to the confusion, peer pressure may exacerbate the difficulties STEM students encounter in their specialized fields. Many students experience peer pressure, and STEM students may be particularly vulnerable to its harmful effects (Patel and Murdock, 2022).

The purpose of this study is to look into the challenges that Grade 12 students face in the Science, Technology, Engineering, and Mathematics (STEM) strand at Diplahan National High School, with the goal of empowering educators, policymakers, and stakeholders to better support students in overcoming these obstacles. The Grade 12 level was chosen because they are the core group to be examined in regard to the problems of STEM education and can provide crucial information to tailor future support measures.

Through the analysis of specific challenges affecting Grade 12 STEM students, the results of this study will pave the way for interventions and programs focused on improving the holistic learning experience to increase participation rates and improve student performances in the STEM fields. This paper attempts to offer significant insights into the problems that students face, be it academic, personal, or institutional, and how such obstacles may be handled and solved.

Statement of the Problem

This study aimed to explore the academic challenges encountered by Grade XII- Science, Technology, Engineering, and Mathematics (STEM) students at Diplahan National High School in Diplahan Zamboanga Sibugay of School Year 2024-2025.

Specifically, this study sought to answer the following questions:

1. What are the academic challenges encountered by Grade XII- Science, Technology, Engineering, and Mathematics students?
2. How do Grade XII- Science, Technology, Engineering, and Mathematics students address the academic challenges?
3. Based on the findings of the study, what are the academic challenges encountered by Grade XII- STEM students?

Results and Discussion

Academic Challenges faced by Grade 12 STEM (Science, Technology, Engineering, and Mathematics) Students

The researchers interviewed different perspectives of Grade 12 students, the researchers met and listened to struggles and challenges as students under the STEM (Science, Technology, Engineering, and Mathematics) curriculum. Using the information and statements given by each respondent during the interview where each theme arises in each response reflecting their academic challenges as Grade 12 students.

Time is Gold. The researchers gathered data from interviews with the respondents, four respondents shared the theme in terms of time value which can be draining and exhausting to them especially when they cram a lot in different subjects. In their statements, they expressed the struggles of time management. (L1, L3, L7, and L10)

"As a Grade 12 student, I constantly struggle to balance my time. I often find myself cramming a lot before exams or rushing through assignments at the last minute because I just can't seem to manage my time well."

(L1 02/27/25)

L1 expressed the frustrations experienced as a Grade 12 STEM (Science, Technology, Engineering, and Mathematics) student, describing how the constant struggle to balance time often leads to cramming for exams and rushing through assignments at the last minute. The respondent shared how this inability to manage time effectively contributes to mounting stress and exhaustion (Robinson & McNeill, 2020).

Overwhelming Workload. The researchers gathered data from interviews with the respondents, three respondents shared their themes in terms of sheer volume of work that students face. The curriculum requires them to excel in various subjects like Math, Science, Engineering, and Technology, each with its own set of assignments, projects, and exams. Students often struggle to allocate sufficient time to each subject, leading to feelings of being overwhelmed. (L2, L5, and L8)

"*There are so many assignments, projects, and exams. Sometimes, I don't know where to start. The workload is just too much, and it feels like there's no break in between."*

(L2 02/27/25)

L2 expressed feeling overwhelmed by the sheer volume of assignments, projects, and exams in the Grade 12 STEM curriculum. Despite efforts to manage time, the respondent struggled to allocate enough time to each subject, leading to confusion and exhaustion. The constant pressure and lack of breaks contribute to the feeling of being overwhelmed (Zimmerman & Kitsantas, 2014).

Academic Stress Due to High Expectations. The researchers gathered data from interviews with the respondents, three respondents shared the overwhelming academic stress caused by the high expectations placed on them in the Grade 12 STEM curriculum. The pressure to excel in multiple subjects simultaneously, each with its own set of assignments, exams, and projects, created immense stress. Many students felt the need to perform at the highest level, fearing that any mistake could jeopardize their future academic opportunities. (L4, L6, and L9)

"There's just so much pressure to do well in everything. Every test, every project, it all feels like it counts towards my future. Sometimes I feel like I can't afford to make mistakes."

(L9 02/27/25)

L9 explained that the constant focus on getting top marks in STEM subjects made the stress worse every day. The pressure to keep up with the fast-paced curriculum and meet high expectations created ongoing stress, as students worried about not being able to meet their teachers' demands and the curriculum requirements (Parker et al., 2012).

Impacts of Academic Challenges in the Academic Performance of Grade 12 STEM (Science, Technology, Engineering, and Mathematics) Students

The researchers interviewed different perspectives of Grade 12 students, the researchers met and listened to the impact of academic challenges that the students experience students under the STEM (Science, Technology, Engineering, and Mathematics) curriculum. Using the information and statements given by each respondent during the interview where each theme arises in each response reflecting the impacts of academic challenges in academic performance as Grade 12 students.

Lower Grades Due to Heavy Workload. The researchers gathered data from interviews with the respondents, five respondents shared that the overwhelming workload often forced them to rush their work or sacrifice sleep just to meet deadlines, resulting in lower grades. Many students struggle to keep up with the fast-paced lessons while managing various academic tasks. (L1, L4, L5, L7, and L10)

"There's just too much to do. I stay up late trying to finish everything, but sometimes I still don't do well in tests."
(L1, 03/12/25)

L1 explained that when students are constantly overloaded, they have less time to review concepts thoroughly. Instead of mastering the material, they rely on memorization, which negatively affects their understanding and performance in exams (Smith et al., 2020). The inability to properly absorb lessons leads to lower test scores, incomplete assignments, and overall academic struggles.

Difficulty Keeping Up with Lessons. The researchers gathered data from interviews with the respondents, five respondents shared that once they fell behind, catching up became even harder, leading to lower grades and increased stress. The fast-paced nature of STEM subjects makes it difficult for students to fully understand one topic before moving on to the next. If they struggle with one lesson, it often creates gaps in their knowledge that affect their ability to grasp future concepts. (L2, L3, L6, L8, and L9)

"Sometimes, by the time I finally understand a topic, we've already moved on to a new one. It feels impossible to keep up."
(L3, 03/16/25)

L3 explained that when students fail to understand key concepts, their performance in quizzes, exams, and projects declines. As the lessons become more advanced, these knowledge gaps make it even more difficult to succeed. This ongoing struggle affects students' confidence and contributes to their overall academic decline (Garcia & Lee, 2018).

Addressing the Academic Challenges faced by Grade 12 STEM (Science, Technology, Engineering, and Mathematics) Students

The researchers interviewed different perspectives of Grade 12 students, the researchers met and listened to struggles and challenges as students under the STEM (Science, Technology, Engineering, and Mathematics) curriculum. Using the information and statements given by each respondent during the interview where each theme arises in each response in addressing the academic challenges faced by Grade 12 students.

Overcoming Challenges Through Seeking Help and Collaboration. The researchers gathered data from interviews with the respondents, five respondents shared that they often felt overwhelmed by the volume of work and academic expectations in the Grade 12 STEM curriculum. Many expressed how they struggled to keep up with assignments and exams across multiple subjects, which increased their stress levels. However, some students found that seeking help from teachers, tutors, or peers helped alleviate their challenges. Collaborative study sessions also allowed them to share the workload and gain different perspectives, easing their individual burdens. (L1, L4, L5, L6, and L8)

"Working together with my classmates on projects and assignments helps me understand things better. Sometimes, just talking to my teacher clears up so many things I was struggling with on my own."

(L5 02/27/25)

L5 highlighted how collaborating with others to complete assignments and discussing difficult concepts with teachers made a significant difference in managing academic tasks and reducing stress. By reaching out for support, students were able to tackle challenges more effectively, thus improving their learning experience and reducing the feeling of being overwhelmed (Perry et al., 2013).

Building a Growth Mindset and Resilience. The researchers gathered data from interviews with the respondents, 3 respondents shared that adopting a growth mindset—believing that intelligence and skills can be developed through effort—helped them overcome difficulties. Instead of viewing failures as obstacles, they saw them as opportunities to learn and improve. (L2, L7, and L9)

"I used to get discouraged when I didn't understand something right away. But then I realized that struggling is part of learning. Now, I keep trying until I get it, and I ask for help when I need it."

(L9 02/27/25)

L9 emphasized that persistence, self-reflection, and learning from mistakes helped them stay motivated despite academic challenges. Encouraging self-discipline and a positive attitude toward learning allowed students to become more resilient and adaptable in their STEM studies (Dweck, 2006).

Cultivating Self-Directed Learning. The researchers gathered data from interviews with the respondents, 2 respondents shared that rather than solely relying on classroom instruction, they proactively sought to enhance their understanding by engaging in independent research, exploring real-world applications of their studies, and utilizing online resources such as simulations, tutorials, and academic forums. (L3 & L10)

"I stopped just waiting for the teacher to explain everything. Now, I read ahead, watch online videos, and even try solving problems beyond what's given in class. It helps me feel more prepared and confident."

(L10 02/27/25)

L10 emphasized that adopting self-directed learning approaches enabled them to anticipate challenging topics and minimized the need for last-minute cramming. By fostering curiosity, posing insightful questions, and consistently challenging themselves with advanced problems, these students developed a deeper appreciation for STEM subjects and enhanced their problem-solving skills. According to Renie et al. (2019), Taking ownership of their educational journey not only kept them engaged but also led to better academic outcomes.

Conclusion

The academic challenges encountered by Grade XII STEM (Science, Technology, Engineering, and Mathematics) students significantly impact their academic journey. Factors such as time management struggles, overwhelming workloads, and the pressure to meet high expectations contribute to their stress and exhaustion. Despite these challenges, students recognize the importance of resilience, collaboration, and self-directed learning in overcoming academic difficulties. Their experiences highlight the demanding nature of the STEM curriculum while also emphasizing the essential skills they develop in the process, such as problem-solving, adaptability, and perseverance. These challenges serve as stepping stones, shaping them into more disciplined and knowledgeable individuals prepared for their future careers in STEM-related fields. Furthermore, their experiences shed light on the reality of the STEM strand, breaking misconceptions and encouraging future students to approach it with realistic expectations and a proactive mindset.

Recommendations

According to the results of this study, Grade 12 STEM students experience some academic challenges that impact their learning process and performance. In order to address these problems and assist students in achieving their potential, some recommendations are offered. Schools must provide workshops and materials on time management and study skills to help students set priorities and develop organized study plans that minimize cramming and academic stress. Teachers are also encouraged to synchronize assignment deadlines and tests between subjects to balance the workload and avoid overloading students. Moreover, encouraging collaborative learning through study groups and peer support can improve understanding and minimize academic isolation. Lastly, the development of a self-directed learning culture—encouraging students to explore, think critically, and learn on their own—will further enhance their comprehension and interest in STEM fields.

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