Motivational factors leading to the high preference of grade 11 STEM students in Divine Word College of San Jose

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Abstract

This descriptive correlational design aimed to determine the motivational factors and high preference of 109 grade 11 students in choosing the STEM strand at Divine Word College of San Jose. Using Weighted mean, Pearson's r coefficient, and regression analysis, results revealed a moderately low agreement in the level of the motivational factors in terms of their interest in the subjects and influencers. The findings of this study revealed that ten indicators in the students' preferences in choosing the STEM track were assessed as moderately low. Moreover, students' preferences for the STEM track were highly influenced by motivational factors such as interest in particular STEM fields, subjects that aligned with academic strengths, and good experiences. Moreover, influencers, including family and friends, and positive remarks from former STEM students also significantly impacted students' track choices. These results highlight how diverse motivating factors are and how they affect students' choices about their education. It is recommended that the school administrators and teachers introduce extracurricular activities or clubs focused on specific STEM subjects, providing hands-on experiences and opportunities for exploration. School counselors may organize career orientation sessions or workshops involving family members where they can learn about the importance of STEM education and its potential career pathway. They may also invite guest speakers from different STEM industries to share their career journeys and opportunities within their fields. Lastly, future researchers may conduct comparative studies across different schools or socioeconomic backgrounds to assess variations in motivational factors and educational outcomes within the STEM domain.

Keywords: high preferences, motivational factors, influencers, interest in the subject, STEM strand

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1. Introduction

Since the K-12 program started, STEM has been the track that almost every student takes due to the wide range of subjects in medicine and engineering, which are some of the most demanded careers in our current days. STEM consists of Medicine and Mathematical Engineering, which caught most students' attention. As Rafanan et al. (2020) stated, STEM has increased the country's production. In Australia, the consensus is that to sustain the country's productivity and prosperity and maintain its competitiveness on the global stage, the workforce and economy need to increase STEM skills and knowledge.

When examining the background of education in the Philippines, Madriaga et al. (2022) concluded that it is important to note that Republic Act No. 10533, which established the K-12 system and added two years to high school (senior high school), was put into effect just eight years ago. The DepEd's goals for these additional years are to develop, strengthen, and improve students, prepare them for the workforce, and create more capable and exceptional students who can compete globally in academics. Various courses in specific fields are offered. Bonquin et al. (2017) mentioned that students should be allowed to choose their course of study. For entering Grade 11 students, the Academic Track's strands (STEM, ABM, HUMSS, and GAS) are the most popular.

Moreover, Rafanan (2020) revealed that the Philippines needs more scientists since there are not enough STEM graduates in the nation. Compared to the UNESCO standard of 380 scientists per million, the Philippines has an extremely low number of scientists—189 per million. The low graduation rate from STEM-related fields is a major contributing factor to the low number of scientists in the nation. Based on average 5-year statistics up till 2016–2017, the Commission on Higher Education (CHED) research found that the completion rate in STEM fields is just 21.10%. The sciences, in particular, had the highest completion rate (25.52%), followed by engineering and technology (18.97%), mathematics (21.20%), information technology (19.56%), and medical and related subjects (14.38%). EduTECH (2016) validated this scenario, indicating that the Philippines is facing a scarcity of STEM workers. Rafanan et al. (2020) emphasize the importance of understanding these trends to address the shortage effectively.

Additionally, one of the arguments put forth by supporters of the K–12 statute, Orbeta et al. (2018), highlighted that SHS graduates could work or pursue entrepreneurial endeavors. They see K–12 programs as a means of assisting pupils in finding better employment prospects following graduation, even if they cannot enroll in college immediately. By including lessons on company management, the curriculum also seeks to educate pupils on how to start their firms. The section on entrepreneurship provides fundamental business management, inspiring the pupils to develop venture concepts and create a business in line with their interests. Over half (50%) of recent high school graduates in STEM fields are ill-prepared for the demanding courses of college (ACT Inc., 2015). Furthermore, an increasing number of students in Divine Word College of San Jose were given the motivation to conduct this study. This study explored why grade 11 students prefer the STEM strand over the other strand. The researchers aimed to understand what made the STEM strand more interesting than the other strands.

Statement of the Problem - This study aimed to determine the level of motivational factors affecting the preferences of Grade 11 STEM students at Divine Word College of San Jose. Specifically, the study sought to answer the following questions: (1) What is the level of motivational factors of the Grade 11 STEM students in terms of their interest in STEM subjects and influencers? (2) What is the level of high preference of Grade 11 students in choosing their strand? (3) Is there a significant relationship between motivational factors and the high preference of grade 11 STEM students for choosing their strand?

Significance of the Study - The researchers believed that the study's outcome could bring significant benefits to the following: first, to the teachers and students, this study will help the students investigate the factors that can influence career decision-making among STEM students at Divine Word College in San Jose. It can assist them with choosing what fits their skills and abilities. Second to the parents, in this research, parents will learn how to guide their children correctly in the course they will take. Parents may guide their children in choosing their preferred course. Third, the conduct of the study will benefit the teachers, as they are the most influential among students because they only want their students to succeed in life. The finest people to offer pupils job development advice are their teachers. Fourth, schools will be able to prepare for the possible huge number of enrollees in the STEM track and to be able to meet the needs of their future students. Lastly, future researchers can use this study to identify motivational factors that might affect the students' decisions in choosing their strand.

2. Methodology

Research Design - This study utilized a descriptive correlational approach to investigate the motivational factors affecting the high preference of Grade 11 STEM students at Divine Word College of San Jose. A descriptive research design is selected to accurately depict phenomena related to students' preferences for the STEM strand. The correlational design aimed to test the relationship between motivational factors and student preferences for choosing the STEM strand.

Respondents of the Study - The study's respondents were the grade 11 STEM students at Divine Word College of San Jose. The researchers used Slovin's formula with a 5% margin of error and a 95% confidence level in determining the study's sample size. Out of 153 grade 11 students, the sample size was 109. The researchers used random sampling to select the respondents to avoid any biases. The respondents came from four sections of Grade 11 STEM. There are thirty-three (33) students from St. Francis, twenty-six (26) students from St. Isidore, twenty-six (26) students from St. Agatha, and twenty-five (25) students from St. Rafael included in this study.

Research Instrument - The researchers used a researcher-made questionnaire as the primary research instrument for gathering the necessary data. This questionnaire aimed to measure the students' interest level in choosing the STEM strand and explored the factors that influence the students' preferences. There are five indicators to describe the motivational aspects of the students in terms of their favorite subjects, five for influencers, and ten items for the reasons for choosing the STEM strand. To determine the validity and reliability of the instrument, the researcher requested the expertise of four teachers from the Divine Word College of San Jose, who are experts in the field of research. Each of them evaluated the relevance and suitability of every item in the questionnaire about the research problem. For the final copy of the survey questionnaire, the researchers followed the suggestions from the experts.

Data Gathering Procedure - To collect the necessary data from the respondents, the researcher obtained the consent and authorization of the principal and academic coordinator of the Divine Word College of San Jose Senior High School to conduct this study. The researchers distributed the validated questionnaire to respondents face-to-face using a printed copy. The researchers asked the assistance of grade 11 advisers to discuss the importance of this research. Students have been given twenty (20) minutes to complete and submit the questionnaire provided. After the questionnaire had been issued and completed by the respondents, the findings were collated and tabulated before being sent to the research adviser for data treatment and analysis.

Statistical Treatment of the Data - The researchers used a weighted mean to determine the level of motivational factors and the preference of senior high school students in choosing the STEM strand. Moreover, Pearson's r coefficient and regression analysis were used to test the relationship between the two identified variables. A 4-point Likert scale of agreement was used to get the exact answer from the respondents.

Ethical Considerations - The respondents' identities were completely anonymous, and their answers were all confidential to respect the students' privacy. The researchers also asked permission from the principal and grade-level coordinator before proceeding with this study. Moreover, a consent letter was sent before distributing

the validated questionnaires to the grade 11 students. To acknowledge the original authors used as supporting literature, the researchers applied the APA 7th Edition.

3. Results and Discussions

Table 1

Mean Level of the Motivational Factors of Grade 11 STEM Students in terms of their Interest in STEM Subjects and Influencers

Indicators (Subjects)	Weighted Mean	Verbal Description
1. I find a particular STEM subject most interesting, which motivated me to choose the STEM track.	2.07	Moderate Low
2. The STEM subjects are aligned with my academic strengths which affected my choice of the STEM track.	2.06	Moderate low
3. I am passionate about specific STEM subjects, which played a significant role in my decision.	2.01	Moderate low
4. The challenging nature of STEM subject/s appealed to me, which contributed to my selection of the STEM track.	2.03	Moderate low
5. My positive experiences with STEM subjects in previous grades influenced my decision to pursue STEM.	2.06	Moderate low
Composite Mean	2.07	Moderate low
Indicators (Influencers)		
1. Family members who are in the same profession influenced my choice of the STEM track.	2.25	Moderate low
2. My teacher/s significantly influenced my decision to choose the STEM track.	2.72	Moderate-High
3. Information from the internet significantly influenced my decision to pursue STEM.	2.28	Moderate low
4. I was inspired by my cousin/s to choose the STEM track.	2.73	Moderate-High
5. The choice of my friends in selecting STEM influenced my decision.	2.46	Moderate low
Composite Mean	2.49	Moderate low

Legend: 4.50-5.00-Very High Extent-3.50-4.49-High Extent; 2.50-3.49-Moderate Extent; 1.50-2.49-Low Extent; 1.00-1.49-Very Low Extent

Table 1 shows the mean level of the motivational factors of Grade 11 STEM students in terms of their interest in STEM subjects and influencers. Motivation is pivotal in students' academic and career choices, particularly in STEM fields. Rafanan et al. (2020) highlighted the importance of understanding motivational factors in addressing the shortage of STEM graduates in the Philippines. The indicator "I find a particular STEM subject most interesting, which motivated me to choose the STEM track" has the highest mean level of 2.07 with a verbal description of moderately low and is ranked one of the five indicators. The indicator "I am passionate about a specific STEM subject" has a mean of 2.01, with a verbal description of moderately low, which ranked it fifth. The composite mean is 2.07, with the verbal description of moderately low. This implies that grade 11 students show a moderate agreement that the offered subjects in STEM were the reasons behind their decisions. They emphasize the global demand for graduates in STEM fields and the challenge many nations face in increasing the number of individuals pursuing careers in these areas. However, there is a concerning decline in students' interest in STEM careers, as evidenced by their study highlighting a decrease in their inclination towards STEM fields and subsequent career choices. This underscores the need to investigate the factors influencing students' attitudes towards STEM subjects, as they directly impact their decisions regarding career paths. By exploring these factors, we can develop targeted interventions to cultivate a greater interest in STEM

disciplines, ultimately addressing the shortage of STEM graduates locally and globally.

Regarding influencers, a composite mean of 2.2.49, interpreted as moderately low, proved that the grade 11 students were inspired by their cousin/s to choose the STEM track. The findings are supported by Dublin et al. (2020), who reveal the significant role of parental influence, noting that parental-stated preferences are more likely to be adopted when parents and children openly discuss career decisions. This underscores the importance of investigating various influences, including familial influences, on students' decisions regarding academic and career paths. By identifying and understanding these influencers, we can better tailor interventions to promote STEM education and careers, ensuring alignment between students' aspirations and choices.

In addition, Moneva & Malbas (2019) shed light on the multifaceted influences that impact students' career choices, emphasizing the role of various factors such as personal interests, learning experiences, and societal expectations. They highlight students' challenges in decision-making, including uncertainty and external pressures. This literature underscores the significance of influencers, including teachers and family members, in guiding students through the complexities of career decision-making. Thus, it influences students' career decisions, with guidance from influencers playing a pivotal role. This contradicts the findings by Hogg et al. (2023), that teachers, in particular, are highlighted as key influencers due to their frequent interactions with students and their ability to provide valuable insights into different career paths.

Table 2

Mean Level of the Grade 11 Students' High Preference in choosing STEM strand

Indicators	Weighted Mean	Verbal Description
1. My choice of the STEM strand is driven by its alignment with my future career goals.	1.71	Low
2. The quality and preparations in the STEM strand contribute to my intention to pursue STEM in college.	1.85	Moderate low
3. STEM-related experiences are crucial to my decision to pursue STEM courses in college.	1.84	Moderate low
4. My STEM subjects are directly related to my desired future career.	1.87	Moderate low
5. A STEM background will open doors to various career opportunities.	1.67	Low
6. The STEM strand would be beneficial in terms of being my foundation of knowledge in higher education.	1.68	Low
7. The STEM strand covers many college courses; thus giving me plenty of career options.	1.75	Moderate low
8. The STEM strand provides knowledge that can be useful in my college course.	2.11	Moderate low
9. Positive feedback from current or former STEM students has influenced my decision to choose the STEM strand.	2.17	Moderate low
10. The skills acquired in the STEM strand are in high demand in the job market.	1.83	Moderate low
Composite Mean	1.85	Moderate low

Legend: 4.50-5.00-Very High Extent-3.50-4.49-High Extent; 2.50-3.49-Moderate Extent; 1.50-2.49-Low Extent; 1.00-1.49-Very Low Extent

Table 2 shows the mean level of the grade 11 students' high preference in choosing the STEM strand. A moderately low composite mean of 1.85 revealed that the grade 11 students showed a low level of agreement in the items presented above. Among the ten indicators, the statement of positive feedback from current or former STEM students has influenced my decision to choose the STEM strand (2.17), interpreted as moderately low.

This implies that the decisions of the grade 11 students in choosing their strands were not dependent on feedback from former students of the STEM strand. Moreover, they believe a STEM background will open doors to various career opportunities, with the lowest weighted mean of 1.67. This means that students still needed to consider the opportunities waiting for them because they were chosen for this strand because of their peer influence.

Kizilay and Yamak (2023) emphasize the critical role of STEM fields (science, technology, engineering, and mathematics) in driving innovation and economic growth. It highlights how individuals with skills relevant to STEM, possessing 21st-century abilities such as inventiveness, originality, problem-solving, and critical thinking, are highly valued in today's digital age. This finding is contrary to Rafanan et al. (2020), who revealed that the main motivation for selecting the specific strand is a career decision or goal, which is based on individual goals, tastes, passions, and skills. Thus, students may be more inclined to choose STEM education if they perceive it as offering pathways to exciting and rewarding careers.

Table 3

Correlation Coefficient and p-value Hypothesis Testing (Ho)

Variables	Correlation Coefficient	Effect Size (r^2r^2)	Critical value	t-value	*P-value*	Interpretation
Motivational factors→ High preference in choosing STEM strand	0.056	0.517	1.984	7.56	0.000	Highly Significant

Legend: p-value<0.01 Highly Significant ; p-value<0.05 Significant

Table 3 shows the statistical results of the test of the relationship between motivational factors and a high preference for STEM strand choice. The statistical result shows the rejection of the null hypothesis with a p-value of 0.000, interpreted as highly significant. Therefore, a highly significant relationship exists between motivational factors and high preferences. Thus, it is considered low, but findings reveal that their interest in STEM subjects and influencers was significant in choosing the STEM strand. Punzalan (2022) showed that students are positively motivated to pursue their academic and professional pathways when their career choices and subject interests align. Students who have a preference for subjects related to science, technology, engineering, and mathematics are more likely to choose the STEM strand. Motivation is a key factor in influencing students' active participation in STEM subjects. Findings showed that students choose STEM majors based on their interests, enjoyment, previous accomplishments, and professional goals. Some students are driven by philanthropy and a desire to make a difference. Parental influence and inspiring K-12 teachers influence students' decisions to pursue STEM majors.

4. Conclusions

Based on the findings, the following conclusions are drawn: There is moderately low agreement on the level of motivational factors regarding interest in the subjects and influencers. The findings of this study revealed that ten indicators of the student's preferences in choosing the STEM track were moderately low. There is a significant relationship between motivational factors and the high preference of grade 11 STEM students in choosing their track.

Recommendations - The following recommendations were presented for the conclusions derived from significant findings. It is recommended that the school administrators and teachers introduce extracurricular activities or clubs focused on specific STEM subjects, providing hands-on experiences and opportunities for exploration. School counselors or career advisors may organize career orientation sessions or workshops involving

family members where they can learn about the importance of STEM education and its potential career pathways. School career counselors may invite guest speakers from different STEM industries to share their career journeys and opportunities within their fields. Lastly, future researchers may conduct comparative studies across different schools or socioeconomic backgrounds to assess variations in motivational factors and educational outcomes within the STEM domain.

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