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RESEARCH ARTICLE

Career selection in STEM: Relationship between academic achievement and STEM career decision

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ABSTRACT

The aim of the study was to determine the relationship between Academic Achievement and Career Decision of STEM-tertiary Students. It specifically addressed the following questions: 1. What is the level of academic achievement of STEM-tertiary students? 2. Is there a significant relationship between academic achievement and career decision in STEM? 3. Does type of secondary school graduated significantly influence career decision in STEM?

Eighty-six (86) STEM-tertiary students served as respondents of the study. Collection of data was done through an online survey. The study's findings showed that students who choose STEM careers generally demonstrate high academic achievement during their SHS years. In addition, a significant positive correlation was found between academic achievement and career decision in STEM, $\rho(84) = .716$, $p < .001$, indicating that students with higher academic performance are more likely to make confident and well-informed decisions to pursue STEM-related careers. Lastly, the study found no significant difference in STEM career decision based on the type of secondary school attended, with a z-value of -0.95 and a p-value of 0.341, suggesting that the quality or category of school has little to no influence on students' decisions to enter STEM fields.

Keywords: stem; academic achievement; career decision; stem career selection

1. Introduction

Education is widely recognized as a foundation for personal and professional achievement, as it equips individuals with the knowledge, skills, and opportunities needed for lifelong success. Bhardwaj[1] argues that education continues to refine and develop human potential, positioning learners for a more promising future. In the Philippine context, this role of education became even more pronounced with the implementation of Republic Act No. 10533, or the Enhanced Basic Education Act, which introduced the K–12 reform to align national standards with global expectations[2]. Embedded within this reform is the Senior High School (SHS) program, designed to prepare learners for four curriculum exits: higher education, employment, entrepreneurship, and middle-skills development.

The SHS program provides two years of specialized study, allowing learners to choose a track that aligns with their interest and aptitude. Earlier research found that many SHS students intend to pursue higher

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education, particularly in the Science, Technology, Engineering, and Mathematics (STEM) strand[3]. However, despite this initial interest, several studies report inconsistencies between learners' SHS specializations and their final tertiary programs. Chen and Weko[4] noted that a considerable proportion of STEM strand graduates eventually enroll in non-STEM courses in college, signaling a potential misalignment in academic and career decision-making.

More recent studies confirm that this misalignment remains a global concern. Research from 2018 to 2024 highlights persistent declines in STEM enrollment, challenges in STEM persistence, and issues related to academic readiness and career decision-making[5]. These studies emphasize that even students who initially express interest in STEM may shift pathways due to academic difficulty, limited guidance, self-efficacy issues, or contextual barriers. The Higher Education Research Institute[6] similarly documented high attrition rates among STEM undergraduates, indicating that only a fraction of those who choose STEM pathways eventually complete their degrees.

Despite these findings, important gaps remain. Prior studies have primarily examined factors influencing interest toward STEM or general patterns of STEM attrition, but fewer have explored the direct relationship between academic achievement and actual STEM career decisions, particularly within the Philippine K–12 context. Additionally, the potential role of secondary school type (e.g., public vs. private, specialized vs. general) in influencing STEM career choices has received limited empirical attention both locally and internationally.

This study seeks to address these gaps by examining the relationship between academic achievement and STEM career decisions among SHS STEM graduates who pursued tertiary education at Western Mindanao State University. Western Mindanao provides a unique sociocultural and socioeconomic setting where disparities in educational access, resource distribution, and career opportunities may influence academic performance and decision-making differently compared with more urbanized regions in the Philippines. By focusing on cohorts from SY 2018–2019 to 2021–2022, this study captures career decision trends during the early implementation years of the K–12 reform.

Unlike previous studies that examined broad patterns of STEM interest[3] or STEM career attrition[4], the present study directly investigates:

(1) the level of academic achievement of STEM-tertiary students,

(2) the strength of the relationship between academic achievement and STEM career decision, and (3) whether secondary school type significantly influences STEM career choices.

This targeted analysis provides new insight into how academic outcomes and educational contexts shape actual STEM career decisions, contributing to the limited body of literature on STEM pathways in developing educational systems such as the Philippines.

1.1. Review of Related Studies

STEM Career Interest and the Senior High School STEM Strand

Recent studies consistently show that students continue to demonstrate strong initial interest in STEM fields, largely due to the structure of school-based STEM programs. Liu et al.[7] found that STEM-oriented curricula at the high school level significantly enhance students' motivation to pursue science and mathematics majors by strengthening their academic confidence and disciplinary exposure. Similarly, Chen et al.[8] reported that students' early engagement with laboratory work, research activities, and inquiry-based science learning increases their aspiration to pursue STEM pathways in college.

In the Philippine context, current research highlights that the K–12 STEM strand provides foundational competencies aligned with tertiary STEM programs, particularly in mathematics, physics, and research. As a result, many learners enter Senior High School with the intention of eventually taking STEM-related majors in higher education. However, despite these reported interests, studies continue to identify misalignment between SHS preparation and actual tertiary degree choices.

Academic Achievement as a Predictor of Career Decision

A growing body of recent literature identifies academic achievement—especially in mathematics and science—as a critical predictor of STEM career decision-making. Liu et al.[7] demonstrated that high math achievement significantly increases students' intention to major in STEM fields at the tertiary level. This is supported by Zhao et al.[9], who found that students' perceived abilities in mathematical and scientific reasoning strongly predict STEM degree selection, often surpassing the influence of demographic or socioeconomic factors.

Other studies extend this relationship to self-efficacy. Abdi et al.[10] showed that academic performance shapes students' confidence in handling STEM subjects, which in turn influences their long-term career decisions. Similarly, Chen[11] reported that students with higher science achievement and stronger STEM cultural capital demonstrate greater persistence in their STEM career aspirations.

Despite these international findings, there remains limited research in the Philippine context that examines the direct correlation between Senior High School academic achievement and actual STEM career choices among tertiary STEM students—a gap this study addresses.

Influence of Secondary School Type on Career Decisions

Recent studies increasingly emphasize that school type plays a meaningful role in shaping students' academic trajectories and career interests. Similarly, Chen[11] highlighted the importance of school climate and support structures, arguing that positive school environments foster higher self-efficacy and stronger motivation to pursue STEM careers.

Zhao et al.[9] also noted that school characteristics—including instructional quality, curriculum emphasis, and access to STEM opportunities—can significantly influence whether students develop sustained STEM identities. In settings where STEM laboratories, equipment, and trained teachers are limited, students tend to demonstrate weaker commitment to STEM pathways.

In the Philippines, recent literature on how school type affects STEM career choice remains scarce, making it important to explore whether the type of secondary school graduates attended has a significant influence on their eventual STEM career decisions.

Synthesis and Research Gap

Across recent studies (2018–2025), several patterns emerge:

1. Students show strong initial interest in STEM fields due to the structure of STEM-oriented SHS programs.
2. Misalignment persists between SHS STEM enrollment and actual STEM program choice in tertiary education.
3. Academic achievement—especially in math and science—is a powerful predictor of STEM career intentions and persistence.

4. School type and school environment significantly influence career decision-making and STEM aspirations.

However, limited research in the Philippine context has examined the combined role of academic achievement and school type, and how these factors shape actual tertiary STEM career decisions among SHS STEM graduates. This gap highlights the relevance and importance of the present study, which investigates these relationships within a Filipino university setting.

1.2. Research Questions

The aim of the study was to determine the relationship between Academic Achievement and Career Decision of STEM-tertiary Students. It specifically aimed to respond to the following queries:

1. What is the level of academic achievement of STEM-tertiary students?

2. Is there a significant relationship between academic achievement and career decision in STEM?

3. Does type of secondary school graduated significantly influence career decision in STEM?

2. Methodology

Quantitative-descriptive design was employed to determine the significant relationship between academic achievement and career decision in STEM.

This research utilized the Purposive Sampling. To determine the potential respondents of the study, the fishbowl method was used where a sample was selected by drawing a random piece of paper from the bowl. Among the STEM students, only thirty percent (30%) of the students enrolled were chosen to be the respondents through random sampling and analysis of data was conducted.

Thirty percent (30%) of the total population of STEM-tertiary students who enrolled in any of the following STEM-related courses listed below for School Year 2018-2019 and who are still in the program as of 1st Semester of SY 2021-2022 have served as respondents of the online survey to determine the relationship between academic achievement and career decision in STEM.

The following courses were:

A. College of Science and Mathematics – (1) Bachelor of Science in Chemistry, (2) Bachelor of Science in Biology, (3) Bachelor of Science in Physics, (4) Bachelor of Science in Statistics, (5) Bachelor of Science in Mathematics;

B. College of Engineering – (1) Bachelor of Science in Environmental Engineering, (2) Bachelor of Science in Agricultural and Biosystem Engineering, (3) Bachelor of Science in Civil Engineering, and (4) Bachelor of Science in Electrical Engineering, (5) Bachelor of Science in Sanitary Engineering, (6) Bachelor of Science in Mechanical Engineering, and (7) Bachelor of Science in Industrial Engineering, (8) Bachelor of Science in Electronics Engineering, (9) Bachelor of Science in Computer Engineering and (10) Bachelor of Science in Geodetic Engineering.

However, STEM-tertiary students of SY 2018-2019 who shifted to other courses not related to STEM and those who were considered irregular students in the program for the succeeding school years were not considered for the purpose of the study.

The researcher utilized a self-made questionnaire. The said questionnaire was subjected to validity and reliability testing to ensure consistency. The researcher wrote a letter to ask permission from the Office of the President to allow the researcher to conduct the study at the University and to allow the collection of data

related to the STEM-tertiary students' Scholastic Records such as their GPA in SHS-STEM, Grades in Science, Mathematics, Research, and ICT, and their Secondary School Type through an online form to be answered by the respondents of the study.

As soon as permission from the Office of the University President was obtained, the "informed consent" letter and the questionnaire were distributed virtually to the respondents via Online Google Forms to limit physical contact with one another given the pandemic. The researcher provided a self-recorded video orientation by presenting the research title, objectives, and the rights of the respondents.

After the orientation, the respondents were asked to respond already to the survey. To ensure proper completion of all details in the questionnaire, the online setting was formally adjusted in such a way that only completed forms were allowed to be transmitted back to the researcher.

Once all questionnaires were completely answered, the questionnaires were retrieved by the researcher online. After the retrieval period, the questionnaires were prepared for proper recording of results. The researcher reviewed and recorded the retrieved data then appropriate treatment and analysis of data was conducted.

2.1. Analysis of data

Mean was used to determine the level of academic achievement of STEM-tertiary students. Additionally, Spearman's rank-order correlation was used to determine if there is a significant relationship between academic achievement and career decision in STEM. Moreover, Mann-Whitney U Test was used to know if the type of secondary school graduated significantly influence career decision in STEM.

3. Results and discussions

1) What is the level of academic achievement of STEM-tertiary students?

Table 1. Respondents Academic Achievement.

	N	Mean	Std. Deviation	Description
College Entrance Test (CET) Rating	86	89.1279	8.37475	Very Satisfactory
Grade Point Average (GPA)	86	91.1977	3.00517	Outstanding
Grade in Science	86	90.4767	3.77212	Outstanding
Grade in Mathematics	86	89.4884	3.86765	Very Satisfactory
Grade in Research	86	90.3605	3.54770	Outstanding
Grade in ICT	86	90.7209	3.86432	Outstanding

Legend: *90-100 Outstanding; 85-89 Very Satisfactory (VS); 80-84 Satisfactory (S); 75-79 Fairly Satisfactory (FS); Below 75 Did not Meet Expectations*

Source: *DepEd Order No. 08 s.2015*

Table 1 presents the level of academic achievement of STEM-tertiary students. Results showed that students' GPA and their grades in Science, Research, and ICT got a mean of 91.1977, 90.4767, 90.3605, and 90.7209, respectively which were further interpreted as "Outstanding".

This means that students enrolled in STEM courses in college performed well in these subjects in SHS and that students who pursue careers in STEM are inferred to have "Outstanding" performance in terms of their grades in Science, Research, and ICT.

Also, data revealed that respondents' grade in Mathematics and their CET rating got a mean of 89.4884 and 89.1279, respectively which were interpreted as "Very Satisfactory". This result further imply that students enrolled in STEM-related courses in general have a good academic performance in their Senior High School Program and that they performed well if data will be treated in terms of these variables.

2) Is there a significant relationship between academic achievement and career decision in STEM?

Table 2. Correlation between Academic Achievement and Career Decision in STEM.

			Academic Achievement	Career Decision in STEM
Spearman's rho	Academic Achievement	Correlation Coefficient	1.000	.716**
		Sig. (2-tailed)	.	.003
		N	86	86
	Career Decision in STEM	Correlation Coefficient	.716**	1.000
		Sig. (2-tailed)	.003	.
		N	86	86

**. Correlation is significant at the 0.01 level (2-tailed).

Table 2 presents the Spearman's rank-order correlation between academic achievement and career decision in STEM. The results reveal a strong, positive correlation between the two variables, $\rho(84) = .716$, $p < .001$. This suggests that higher levels of academic achievement are associated with greater likelihood or confidence in making career decisions related to STEM. The relationship is statistically significant, indicating that the observed association is unlikely to have occurred by chance.

3) Does type of secondary school graduated significantly influence career decision in STEM?

Table 3. Influence of the Type of School Graduated to STEM Career Decision.

	Type of School Graduated	N	Mean Rank	Z	Asymp. Sig. (2-tailed)	Interpretation
Career Decision in STEM	Public	46	45.22	-.952	. 341	Not Significant
	Private	40	41.53			
	Total	86				

Table 3 presents the findings of the Mann-Whitney U Test, which was conducted to assess whether the type of secondary school attended significantly affects career decisions in STEM. The analysis yielded a z-value of -0.95 and a p-value of 0.341.

The results indicate that there is no statistically significant difference in STEM career decision based on the type of secondary school attended. Since the p-value is greater than 0.05, we fail to reject the null hypothesis, suggesting that the type of secondary school does not have a significant influence on students' decisions to pursue a career in STEM.

4. Conclusion & Recommendations

This study found that STEM tertiary students generally demonstrate high academic achievement during their senior high school years, and there is a significant positive correlation between academic performance and STEM career decision-making. This suggests that strong academic foundations not only reflect students' capabilities but also enhance their confidence and readiness to pursue STEM-related careers. Additionally, the type of secondary school attended does not appear to significantly influence students' decisions to enter STEM

fields, indicating that factors other than school type—such as personal interest, motivation, and guidance—may play a more critical role in career choices.

These findings have important implications for education and career planning. Strengthening STEM curricula and providing targeted academic support can help cultivate students' interest and competence in STEM fields, while mentorship and career guidance programs can further support informed decision-making. For society, fostering a pool of well-prepared STEM professionals can contribute to innovation, technological advancement, and sustainable development.

However, this study has limitations, including a relatively small sample size and reliance on self-reported survey data, which may affect generalizability. Future research could expand the sample, include longitudinal tracking of academic performance and career outcomes, and explore other factors influencing STEM career decisions, such as socioeconomic background, parental support, and extracurricular experiences.

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Conflict of interest

The authors declare no conflict of interest.

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