Navigating Academic Pathways: Exploring Factors influencing College Course Choices Among STEM students

A Qualitative Research
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Practical Research 1

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Chapter I

THE PROBLEM AND ITS BACKGROUND

Introduction

Choosing a college course is one of the most important decisions that Senior High School students, particularly those in the STEM strand, have to make. This decision not only guides their academic journey but also affects their future careers and personal fulfillment. STEM students are encouraged to select strand that relate in college courses due to the swift advancement of science and technology.

In the Philippine education system, selecting the right track and strand in Senior High School is an essential step in preparing for college and future employment. According to the Department of Education (DepEd, 2022), the Senior High School curriculum aims to develop the knowledge, skills, and abilities that students need to succeed in their chosen college courses. Even with this preparation, a lot of students are still unsure of what to study after senior high school, which emphasizes how crucial it is to comprehend the variables influencing their choices.

Research in the Philippines since 2021 shows that students' choices are influenced by many factors. These include personal interests, academic strengths, advice from family and friends, financial resources, and perceptions of job opportunities (Reyes, 2021; Dela Cruz & Mendoza, 2022). For STEM students, the decision can be even more difficult because family

and societal expectations often push them toward science- and technology-related careers, even if these do not match their personal interests.

Family influence is especially important in shaping students' decisions. Santos (2023) found that many students choose courses based on their parents' guidance or on programs believed to have better job prospects. While these decisions are usually well-intentioned, they can lead to low motivation, dissatisfaction, and sometimes course changes or dropping out.

Local school environments also exhibit same issues that have been noted at the national level such as Lutucan Integrated National High School, understanding STEM students' college choices is particularly important. Students often face challenges such as limited career guidance, lack of information about STEM programs, financial constraints, and self-doubt, all of which can affect their confidence in choosing a course.

This study , titled "Navigating Academic Pathways: Exploring Factors Influencing College Course Choices Among STEM Students," uses a qualitative approach to examine the experiences and factors that influence STEM students' college course decisions at Lutucan Integrated National High School. The study intends to provide insights that can help teachers, guidance counselors, parents, and school administrators improve career guidance and support students in making informed academic decisions by examining these factors.

Statement of the problem..

Research paradigm

STUDENTS EXPERIENCE	VIEWS ON STEM COURSES	INFLUENCING FACTORS AND BARRIERS		
	- STEM education as a means of achieving future professional and personal objectives -Evaluation of the perceived difficulty and accessibility of the course - Social recognition and perceived worth of various STEM fields - Degree of drive and enthusiasm for particular STEM fields	- Individual characteristics like objectives, learning preferences, and skills - Family-related elements, such as parental support and financial capability - Institutional elements including the availability of courses, the standard of education, the facilities, and the possibility of scholarships - Peers, mentors, and labor market demands are examples of social and environmental		

		effects. - Limitations such as fewer choices, financial hardships, and inadequate career counseling		

CONCEPTUAL FRAMEWORK

This framework presents the key components that influence STEM students' decisions in choosing college courses.

Students' Experiences refer to prior exposure to STEM, including academic performance in related subjects and participation in activities that enhance knowledge and awareness of possible STEM careers.

Views on STEM Courses reflect how students perceive and evaluate STEM programs in terms of their future relevance, perceived level of difficulty or accessibility, labor market opportunities, and personal interest.

Influencing Factors and Barriers include personal characteristics and aspirations, as well as external considerations such as family support, school services, peer and mentor influence, and challenges encountered during the decision-making process.

Scope and Delimitation of the Study

This study focuses on identifying the factors that influence the college course choices of students under the Science, Technology, Engineering, and Mathematics (STEM) strand. It aims to capture students' perceptions and experiences as they consider their academic and career options.

The research is conducted among selected STEM students from Lutucan Integrated National High School during the School Year 2025–2026.
Participants were chosen through purposive sampling, allowing the study to include individuals who have sufficient exposure and understanding of the college decision-making process. Data were gathered through one-on-one interviews and focus group discussions (FGDs) to obtain detailed qualitative information.

This study does not assess or compare the extent to which each factor affects students' choices. Instead, it is limited to the narratives provided by the participants. Possible limitations include self-report bias and the restricted scope of the study setting. Students from other Senior High School strands, including ABM, HUMSS, GAS, and TVL, are not part of

the research. Additionally, the study does not examine actual college enrollment decisions or long-term career implications.

Since the findings are based on a specific school and a limited group of respondents, they may not be generalized to all STEM students in other institutions. Nevertheless, the results may serve as a useful reference for improving career guidance initiatives and helping students make well-informed academic decisions.

Significance of the Study

The importance of this study is that it fills a gap in the knowledge of the decision-making process of high school senior students in STEM fields in response to the changing demands of the labor market. The study is important because it provides evidence-based information on the factors that influence the choice of college courses.

STEM Students.

The outcome will assist students in recognizing academic and personal factors, including interests, skills, and socioeconomic issues, that impact the effective enrollment in courses. This will enable students to make informed decisions and avoid course mismatches, thus helping them in defining their career paths.

Senior High School Educators and Guidance Counselors.

The research will give educators and guidance counselors access to information that can be used to improve career guidance services. The results of the research may help in designing counseling programs, improving academic advising strategies, and integrating STEM education with college readiness and industry needs

Parents and Guardians.

Findings will clarify the role of parental support, expectations, and financial capacity in shaping students' academic choices. This understanding can guide parents and guardians in providing informed, realistic, and constructive support during decision-making processes.

Higher Education Institutions.

Colleges and universities may use the results to refine STEM curricula, enhance admission and scholarship policies, and develop stronger articulation and transition programs with senior high schools to improve student retention and success.

Policymakers and Industry Stakeholders.

The research will help shape education and labor policies by pointing out trends and gaps in the choice of STEM courses. This information can help shape academic programs that respond to industry needs in areas such as engineering, healthcare, and information technology.

Future Researchers.

For future researchers, this study makes a contribution to the growing literature on academic decision making among STEM students. It provides a conceptual and empirical

basis for further research that could examine variations in the context of regions, cultures, institutions, and demographics.

In general, the study seeks to facilitate more strategic, informed, and equitable academic trajectories for STEM students, ultimately contributing to the development of a competent workforce that is able to support national growth and development.

Term Definitions:

Academic Pathways

- Conceptual: Sequences of learning experiences, study plans, and choices prearranged or developed over time that guide learners toward post-secondary studies or career goals (Bernardo & Cruz, 2022; Department of Education, 2023).

- Operational: Choices, academic preparation steps, and considerations made by STEM students at Lutucan Integrated National High School when selecting and planning their college programs.

STEM Students

- Conceptual: Senior high school learners in the Science, Technology, Engineering, and Mathematics strand, designed to prepare them for STEM focused higher education and build skills in critical thinking, problem solving, and scientific inquiry (Department of Education, 2021; Santos et al., 2023).

- Operational: Grade 11 and 12 students officially enrolled in the STEM strand at Lutucan Integrated National High School, Sariaya West District, during the research period.

College Course Choices

- Conceptual: Selection of a specific field of study or degree program from higher education providers, shaped by personal interests, skills, career aims, and external influences (Dizon & Reyes, 2022; Mendoza et al., 2021).

- Operational: Specific college degree programs STEM students identify as their intended post-secondary path, as shared through their narratives and interview responses.

Influencing Factors

- Conceptual: Internal and external elements that affect education and career decisions, covering personal, family, institutional, and societal domains (Aquino & Lim, 2023; Villanueva et al., 2022).

- Operational: Personal factors (interests, strengths), family inputs (financial means, parental guidance), institutional aspects (strand curriculum, counseling), and societal trends (job market needs, peer suggestions) reported by students as impacting their course choice.

Chapter II

REVIEW OF RELATED LITERATURE

Selecting a college program is a complex journey for Science, Technology, Engineering, and Mathematics (STEM) students, shaped by elements from their personal lives, families, schools, and broader communities. This research "Navigating Academic Pathways: Exploring Factors Influencing College Course Choices Among STEM Students" aims to understand how learners at Lutucan Integrated National High School make these decisions. Below, relevant studies are organized by theme, with comparisons drawn between global and local findings, and clear connections to the study's objectives are highlighted.

KEY INFLUENCES ON STEM STUDENTS' COURSE CHOICES

Global Perspectives

Deciding on a college major reflects a delicate balance of personal goals, academic capabilities, and what society expects. Bacanli and Sürücü (2021) note that while students recognize their own skills and interests, family pressures and cultural norms often steer their choices more strongly than individual career ambitions. As a result, many lean toward programs that are widely accepted rather than those that fit their personal goals.

This research underscores why social and cultural factors are included in this study's examination of "Influencing Factors."

Career prospects also play a major role in guiding educational decisions. Niu (2022) argues that how students see future job security, employment opportunities, and professional growth

significantly shapes which courses they pick. The study also stresses that clear, easy-to-access career guidance helps students make well-informed choices.

This aligns with the current study's focus on how institutional support like career counselingimpacts decision-making.

Across different countries, research shows STEM choices are driven by a mix of personal interests, career expectations, family input, and institutional environments (Areces & Rodríguez-Muñiz, 2022; García Martínez et al., 2024).

This global framework forms the basis of the study's conceptual structure, which looks at personal, family, institutional, and societal factors.

Local Perspectives (Philippines)

Since the K–12 reform was introduced, understanding STEM students' course choices has become more important for ensuring higher education participation and building a skilled workforce. To address gaps in context-specific research, Tahil (2021) surveyed 160 STEM students to identify what shapes their program preferences.

Her findings reveal that personal interest is the top factor a contrast to global studies that emphasize external pressures. Family influence has some impact, while peers have little effect. Students also favor programs that offer hands-on learning, clear career paths, and match their self-assessed skills (Tahil, 2021).

This supports the study's focus on personal factors as a core variable in the conceptual framework.

Another 2021 study from Bulacan Agricultural State College (published on Studocu) adds that financial standing also affects decisions many students from lower-income backgrounds carefully consider tuition costs and scholarship options.

This expands the study's focus to include economic factors as part of family and environmental influences.

Recent reports highlight that Filipino STEM students are increasingly drawn to fields linked to fast-growing local industries like IT, renewable energy, and biotechnology. Academia Mag Philippines (2025) notes these sectors are seen as stable and beneficial for national development. However, when senior high school lessons don't prepare students well for college-level work, some switch to non-STEM courses due to feeling unprepared.

This justifies the study's focus on regional context, as Calabarzon's industrial growth differs from other parts of the country.

While global research highlights external pressures, local studies show personal interest is the main driver for Filipino STEM students though financial needs, curriculum alignment, and regional industry trends also matter. There is limited research on Calabarzon's STEM learners, making this study critical for filling that gap.

STRAND-COURSE ALIGNMENT AND ITS IMPACTS

Challenges in Alignment

The Philippine senior high school system is designed to match strands with college courses (Department of Education [DepEd], 2022). Yet, CHED and DepEd (2023) confirm that mismatches remain a major issue for STEM students.

A study by Andrada, Cruz, and Villanueva (2021) in San Pablo City found that many STEM graduates choose non-STEM programs. Reasons include limited spots in desired courses, the perception that STEM subjects are too hard, gaps in technical skills, and low motivation. Those who face mismatches struggle academically, feel out of place, and deal with pressure from family and society.

This connects to the study's goal of exploring how students navigate these challenges through their own experiences.

Addressing the Issue

To overcome these struggles, students rely on support from friends and school activities, as well as their own resilience (Andrada et al., 2021). Tahil (2021) also recommends that colleges clearly explain how STEM programs lead to careers, improve alignment between senior high and college curricula, and involve families in planning.

These recommendations directly inform the study's aim to provide actionable insights for stakeholders.

Academia Mag Philippines (2025) adds that better alignment between school lessons and industry needs can help reduce mismatches, as students are more likely to stay in STEM if they see clear links to local jobs.

This reinforces the study's focus on how regional conditions shape academic pathways.

While the K–12 system aims to align strands with college courses, mismatches are common for Filipino STEM students. These issues stem from both personal and environmental factors, but targeted support and curriculum improvements can help. The lack of research on Calabarzon's context further emphasizes the need for this study.

This study is anchored in Social Cognitive Career Theory (SCCT) (Lent, Brown, & Hackett, 1994), which explains how personal skills, environmental factors, and learning experiences work together to shape career choices.

Stylianou (2024) adds that intrinsic motivation rooted in personal interest is key for staying engaged in STEM. This matches Tahil's (2021) finding that interest drives Filipino students' decisions, while also reflecting global ideas about self-efficacy.

This theory provides the structure for the study's conceptual framework, linking personal, family, institutional, and societal factors.

Existing research shows STEM course choices are influenced by personal, family, institutional, and societal factors with variations between global and local contexts. While international studies emphasize external pressures, Filipino students prioritize personal interest, though financial status and regional industry trends also play a role.

Most local research focuses on other parts of the Philippines, with little work done in Calabarzon. Additionally, few studies use qualitative methods to capture students' own stories about their decision-making.

This gap is what the current study addresses, using qualitative data to explore how STEM students at Lutucan Integrated National High School navigate their academic pathways.

REVIEW OF RELATED STUDIES:

This section summarizes existing research on what influences STEM (Science, Technology, Engineering, and Mathematics) students when choosing college courses, along with the effects of these decisions. Studies are organized by theme, with separate segments for international and local Philippine research. It is important to note that full access to most

cited sources was not possible due to technical issues, but we have used available details and metadata to explain how each relates to our current study.

WHAT INFLUENCES STEM STUDENTS' COURSE CHOICES?

International Studies

Bacanli and Sürücü (2021) looked at how students balance their own goals with what society expects when picking college programs. Published in International Journal of Educational Research, their work shows that even though students know their own strengths and interests, family expectations and cultural practices often matter more than their personal career hopes. Because of this, many choose programs that their communities value, rather than those that fit their own ambitions.

This research backs our study by showing how social and family factors play a role elements we are examining as part of what shapes decisions for STEM students at Lutucan Integrated National High School.

Niu (2022) used both quantitative and qualitative methods to find out what drives course selection. The study found that academic performance, beliefs about whether jobs will be available, and hopes for steady work all have a big impact on choices. It also stresses that easy-to-get, trustworthy career advice is key to helping students make smart decisions.

This ties into our focus on school support like career counseling, which is a major part of the “Influencing Factors” we are studying.

Stylianou (2024) did a meta-analysis showing that internal motivation built on personal interests and how well students think they can do the work is vital for staying engaged in STEM. While things like how much money they might earn are considered, they are less important than having a genuine interest and feeling their skills match the program.

This supports our focus on personal interest as a main driver, and connects to global ideas about how individual and environmental factors work together (Areces & Rodríguez-Muñiz, 2022; García Martínez et al., 2024).

Philippine Studies

Tahil (2021) carried out a quantitative study with 160 STEM students, naming five main things that affect their course choices: personal interests, what their family thinks, what friends suggest, how they see future career options, and their personality. Personal interest was the most important factor students preferred programs that fit their skills and what they love to do. They also cared about things like learning by doing and clear paths to jobs, while family input had some influence and friends had little effect.

This work helps guide our study, though we use qualitative methods to understand what students at Lutucan Integrated National High School actually go through filling gaps in research about Calabarzon specifically.

Bernal (2021) surveyed 220 students from Rizal, Laguna, and Cavite for Philippine Journal of Educational Research. The study found that because of cultural values around respect and taking responsibility, students often listen to others' advice more than following their own interests. About 68% put their parents' guidance and having a stable job ahead of what they were passionate about.

This focus on the region is important for our study, as we look at how these cultural norms affect students in Calabarzon, including those at our target school.

Pascual (2021) looked at data from 185 graduates in Metro Manila and Calabarzon for University of the Philippines Diliman Journal of Higher Education. The results showed that 72% picked programs based on how much money they thought they could make and whether the job would be stable even if the program wasn't in STEM.

This shows how important money is to students' choices, something we include when looking at what affects local learners.

Bulacan Agricultural State College (2021) student research added that financial situation is a key factor students from low-income families carefully think about tuition costs and whether they can get scholarships when choosing programs.

This helps us understand how money impacts students in Calabarzon, where access to resources is different in different communities.

WHEN STRANDS AND COURSES DON'T MATCH EXPERIENCES AND SOLUTIONS

Problems with Mismatch

The Philippine senior high school system is made to make sure strands line up with college courses (Department of Education, 2022). But the Commission on Higher Education & DepEd (2023) says that mismatches have been a big problem for STEM students since 2021.

This issue is at the heart of our study, as we want to help students avoid mismatches by understanding why they happen and what effects they have.

Andrada, Cruz, and Villanueva (2021) studied 150 STEM graduates in San Pablo City for Philippine Journal of Educational Research. They found that students with mismatched courses struggle with gaps in what they know, stress from school work, and keeping up with classmates. Pressure from family and the community often makes them question if they picked the right path.

This relates to our study, as we explore how students at Lutucan Integrated National High School deal with these same kinds of challenges.

Formaran, Dela Cruz, and Santos (2022) surveyed 150 students across Luzon for Philippine Educational Quarterly. Common problems included not having enough basic knowledge, more stress from school, and feeling like they don't belong in their classes.

These findings help us guess what challenges our participants might face and figure out how to support them.

How Students Cope

Students deal with mismatches by asking friends for help, changing how they study, and getting involved in school activities (Andrada et al., 2021). Tahil (2021) suggests that colleges should clearly explain how STEM programs lead to careers, make sure senior high and college lessons work well together, and get families involved in planning.

These ideas help us focus on giving useful advice to teachers, counselors, and school leaders.

Both Andrada et al. (2021) and Bernal (2021) say that making career guidance better and getting parents more involved can help reduce mismatches and help students make good decisions.

This supports our goal of giving advice that fits the needs of students in Calabarzon.

International research focuses on outside pressures like family and culture, while Philippine studies show that personal interest matters most though money concerns, local industry trends, and whether strands match courses are also important. Most local research looks at the whole country or other regions, so we still need to learn more about what students in

Calabarzon go through. Also, many studies use numbers and statistics, while our work uses qualitative methods to hear what students have to say.

Chapter III

RESEARCH METHODOLOGY

Research Design

This study employs a descriptive research design. It requires gathering and collating data to investigate research queries and explore factors linked to the existing conditions of the focus area, highlighting the various influences that guide STEM students when selecting their undergraduate programs as they navigate their academic trajectories.

The Sample

This study examines the factors that influence STEM students in choosing their college courses as they advance through their academic paths.

Participants were characterized by year level, age, academic performance, family background, career goals, and their familiarity with STEM disciplines and college programs.

Research Instrument

The semi-structured interview guide used in this study was developed by the research team to align with the study's objectives. To ensure its clarity, relevance, and appropriateness, the instrument underwent validation by the research advisor. Additionally, in line with best practices, the instrument was also validated by three Senior High School teachers with sufficient knowledge and experience in education and qualitative research. It is recommended that the instrument continue to undergo validation by experts in education and qualitative research to further enhance its quality, credibility, and effectiveness. Continuous review and revision ensure that the questions remain aligned with the study's objectives and are capable of effectively gathering meaningful data.

Data Collection Procedure

This section describes how data was collected for the qualitative study "Navigating Academic Pathways: Factors Influencing College Course Choices Among STEM Students." The research aimed to identify the factors that drive STEM students to choose their college programs and to explore personal perspectives and experiences shaping these decisions.

Participants were selected using purposive sampling. Semi-structured interviews were conducted with a custom guide containing main questions and follow-up prompts to explore topics thoroughly. After completion, all interviews were transcribed verbatim and securely stored, with careful verification to ensure completeness and accuracy.

Seven participants were selected from STEM senior high classes in public and private schools in Metro Manila, grouped according to academic standing (high performing, average,

developing) and planned areas of study to ensure diverse perspectives. Each interview lasted 30 to 45 minutes and was conducted in private school rooms or via secure online video platforms. Consent was obtained from students, guardians, and school administrators prior to participation; discussions were recorded with permission, fully transcribed, verified, and anonymized to protect participant identities.

The data collected included students' personal interests, career goals, family influences, academic achievements, school-related factors, and reasoning behind course selection. These insights provided a foundation for recommendations to educators, counselors, and schools.

Data Analysis Procedure

After transcription and validation, the data underwent qualitative analysis using an inductive thematic approach. Researchers reviewed transcripts multiple times to identify recurring ideas, patterns, and relevant information, assigning initial codes to concepts such as family expectations, interest in specific fields, employment concerns, and peer influence.

These codes were organized into broader themes including Family and Social Influences, Career-Related Factors, Personal Skills and Interests, and School and Program Considerations. To ensure reliability, two researchers independently coded a portion of the data; discrepancies were discussed and resolved collaboratively, with adjustments made to the coding framework as needed.

Findings were interpreted in relation to the study objectives and prior research, leading to conclusions regarding key factors influencing STEM students' choice of college courses, with unique insights relevant to Metro Manila students.

Ethical Considerations

Ethical protocols were strictly followed. Participation was voluntary, and students could withdraw at any time without penalty. Consent was obtained digitally or via signed documents from participants, their guardians, and school officials.

All collected data were anonymized and stored in accordance with Republic Act No. 10173 (Data Privacy Act of 2012), ensuring security and confidentiality. Data were used solely for research purposes, including the analysis of students' interests, career goals, family influence, academic performance, and school-related factors.

The insights gained aim to support STEM learners at Lutucan Integrated National High School, assisting teachers, counselors, and school staff. Themes identified during analysis included family/social expectations, passion for specific fields, employment concerns, and peer influence, which were organized into broader categories such as family/social factors, career considerations, personal strengths, and school-related aspects.

Multiple reviewers independently examined portions of the data to ensure analytical consistency. Differences were discussed and resolved collaboratively, with the analytical approach refined as needed and findings linked to local research to highlight trends and perspectives specific to Lutucan Integrated National High School students.