

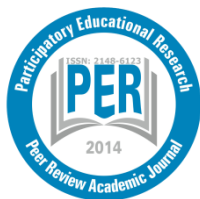
PAPER DETAILS

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Pursuing STEM Careers: Perspectives of Senior High School Students

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This qualitative descriptive research explored the perspectives of STEM (science, technology, engineering, and mathematics) senior high school students in a public secondary school in Zambales, Philippines on their reasons why they enrolled in STEM and their intent to pursue relevant career. A total of 20 Grade 12 students were purposively selected as participants of the research. The participants were interviewed using a validated structured interview guide. The recorded interviews were individually transcribed to arrive at an extended text. The extended texts were reviewed to generate themes and significant statements. The paper found out that senior high school students are generally interested in the field related to biology. The alignment to the preferred course in college is the primary reason of the participants for enrolling in STEM. Almost all the students wanted to pursue STEM-related careers after their university graduation. Further, personal aspiration is the main reason for the participants to pursue STEM-related professions. The study recommends that senior high schools may design various activities during the career week. These activities may include possible career paths in STEM-related courses, students' career and motivation, and their career aptitude. Teachers may also infuse innovative pedagogies for better STEM instruction. For the students to have more interest in science, it is recommended that STEM teachers undergo retooling or pursue advanced studies. Senior high schools may conduct career guidance seminars for the students to guide them on what strands they should take. The Department of Education (DepEd) may support the implementation of different programs regarding students' career preparation. This program will help the students to be more aware on what career path they wanted to pursue, and to avoid pressures from

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peers. Schools may advocate a collaborative, authentic and goal-oriented learning environment with respect to the demand of Industrial Revolution 4.0.

Introduction

An abundant number of cases had caught the society's attention when college students who graduated in the STEM (science, technology, engineering, and mathematics) strands started choosing a non-STEM field as their major when they enrolled in college (Chen & Weko, 2009). Another alarming problem is when most of the students who entered college with an original aim of pursuing a STEM field career, drop out of school, or choose a non-STEM program. Similarly, the Higher Education Research Institute (2010) indicated a 20% to 50% of student loss rates in college STEM disciplines. This is a particular manifestation that society is currently experiencing a shortage of workforce in STEM fields.

Globally, the demand for STEM graduates is very high. Hill, Corbett & St. Rose (2010) mentioned that many countries in the world face the task of recruiting more individuals into STEM industries. However, students' interest in STEM careers is declining. Several studies reported a decline in student engagement with STEM and subsequent choices to pursue STEM-related careers (American Institute of Physics, 2014; Barton, Tan, & Rivet, 2008; Bottia, Stearns, Mickelson, Moller, & Valentino, 2015; Roberts, 2002; Stagg, Laird, & Taylor, 2003).

Undoubtedly, STEM had contributed vital importance in building the nation's productivity. In Australia, the prevailing view is that the workforce and economy require additional STEM skills and knowledge to support the nation's productivity and prosperity and thus remain competitive on the international platform (Siekmann & Korbel, 2016). Relatively, a strong focus was also given by the STEM-related industries in the United States just to alleviate the number of students engaging in postsecondary participation in STEM education (Baber, 2015). Moreover, Malaysia is in dire need of a workforce in the year 2020 (Vijandren, 2018). But despite the government's commitment, Malaysia still had been struggling to meet the human capital demand that is necessary for 2020. In recent years, STEM field enrollees had continued to decline (Halim & Meerah, 2016).

In the Philippines, STEM graduates are insufficient; hence, the country does not have sufficient scientists (Anito, Morales & Palisoc, 2019). The Philippines only has 189 scientists per million which is very low compared to the UNESCO recommendation which is 380 per million (Anito et al., 2019). The low number of scientists in the country is greatly attributed to the low graduates of STEM-related careers. The Commission on Higher Education (CHED) report revealed that the completion rate across STEM areas based on the average 5-year data until 2016-2017 is only 21.10%. In particular, sciences had a completion rate of 25.52% followed by mathematics (21.20%), information technology (19.56%), engineering and technology (18.97%), and medical and allied fields with 14.38%. This scenario is further validated by EduTECH (2016) that the Philippines is experiencing shortages in the workforce in the field of STEM.

In the school year 2016-2017, the Department of Education (DepEd) started implementing the senior high school under the K to 12 program in the Philippines. The two additional years are intended to supply enough time and to provide adequate knowledge and skills to prepare the students for future employment. Four tracks were offered in the said program, including the academic track where the STEM strand is included.

The study explored the reasons why the senior high school (SHS) students enrolled in a STEM-related field and whether they will pursue a STEM career. This research hopes to shed light on the motivation, interest, and career path of students who enrolled in STEM in the basic education schools in the Philippines. Moreover, the research gap that this paper also hopes to address is the shortage of studies on career path of Filipino students who enrolled in STEM strand with the end view of proposed recommendatory policies and practices to increase students' interest in enrolling and pursuing career in STEM, and producing more STEM-oriented professionals in the country.

STEM Education

The review of the related literature for this study focused on the different studies concerning the factors affecting the perception of high school students in choosing STEM strand. STEM was meant to epitomize a significant connection that occurred among science, technology, engineering, and mathematics (Bolds, 2017; Patton, 2013). STEM strand focuses on advanced concepts and topics compared to other strands. In this track, students are expected to become a pilot, an architect, an astrophysicist, a biologist, a chemist, an engineer, a dentist, a nutritionist, a nurse, a doctor, and a lot more, even the marine engineers could take this track.

According to Orbeta, Lagarto, Ortiz, Ortiz, and Potestad (2018), one of the reasons provided by proponents of the K to 12 law is that SHS graduates can work or engage in entrepreneurial activities if they choose to do. They view K to 12 programs as a way of help for the students to land on better job opportunities after graduation even if they can't enroll themselves in college right away. The curriculum also aims to teach the students to become entrepreneurs by adding classes that tackle about managing businesses. The entrepreneurship component offers basic business management, which encouraged the students to generate business ideas and make a profit according to their passion. More than half (50%) of high school graduates directed in the STEM field are not prepared for their tough college coursework (ACT Inc., 2015).

Several researches revealed that STEM majors were academically prepared especially in mathematics and science test scores, were successful when it comes to GPA, and persistent in earning a STEM degree (Chen, 2013; Chen & Ho, 2012; Mattern, Radunzel, & Westrick, 2015; Shaw & Barbuti, 2010).

Honey, Pearson, and Schweingruber (2018) stated that in educational practice and research, the term integrated was used loosely and was typically not carefully distinguished from related terms such as connected, unified, interdisciplinary, multidisciplinary, cross-disciplinary, or transdisciplinary. Defining integrated STEM education was further complicated by the fact that connections can be reflected at more than one level at the same time: in the student's thinking or behavior, in the teacher's instruction, in the curriculum, between and among teachers themselves, or in larger units of the education system, such as the organization of an entire school (Honey et al., 2018). The multidimensional nature of integrated STEM education led to one of the significant tasks to identify and characterize existing approaches to integrated STEM. Evolving learners' understanding and appreciation utilizing integrated content, abilities, and methods of thinking interactions, encompassed in what way they upkeep and accompany one another, and was not a stress-free task (English, 2016).

Students' Interest in STEM

Song and Glick (2004) stated that igniting the interests of students in STEM careers may be influenced by their perception of their potential careers and potential earnings. Southeast Asian women, particularly for the Chinese, Filipino were more inclined to STEM major rather than White women mainly because of the influence of possible earnings. Better STEM careers activity arises where subject teachers see the preparation of young people for work, as an integral part of their professional role, and where they have the professional skills and confidence to act on this (Finegold, Stagg, & Hutchinson, 2011).

According to Harackiewicz, Rozek, Hulleman, and Hyde (2012), without the proper knowledge about STEM-based careers, students who prefer to take a STEM field career might be discouraged with the decreasing number of students pursuing the strand. This may result in misconception and diminish their desire to participate in activities that may open awareness and knowledge about the STEM career.

Pursuing STEM-related Careers

According to Franco and Patel (2017), there are five related categories regarding the understanding and experiences of the students: students' thinking of engagement, challenges influencing engagement, teachers' facilitation of engagement, course assignments, and engagement, and facilitation of content utility. Trusty (2002) states that the likelihood of women choosing STEM major is affected by encouraging students to take the most academically intensive math courses such as trigonometry, pre-calculus, and calculus. A strong positive STEM identity is a predictor of future career choice in a STEM field (Martin-Hasen, 2018).

McCharen and High (2010) said that there are higher enrollment and persistence rates in STEM-related postsecondary degree programs to those students who were able to complete their high select high school pre-engineering programs. According to Villena (2017), the K to 12 program implementation helped the students to be prepared in their future career, as they finish the SHS, the career guidance program assisted them in deciding the best career to be taken in the future.

Rask (2010) states that the STEM program is very costly in terms of one's motivation and future career potential as well. STEM education is one of the most in-demand strands in DepEd's senior high school. With the K to 12 curriculum, more students became more competitive, especially in the field of science and technology, as well as in engineering and mathematics using advanced concepts and topics. As a result, the Philippine education system is continuously improving, and it also helps the students to be more globally competitive. But due to lack of scholarship opportunities, lack of parental support, and some other factors, many STEM students fail to finish their chosen careers.

Theoretical Framework

The present study is anchored on the Social Cognitive Career Theory (SCCT). According to Lent, Brown, and Hackett (1994), the developed SCCT empowered understanding of career choice, interest, and performance processes. This theory acknowledges the aspects that interchange when a particular track progressed on the chosen career path of the students. Furthermore, using social cognitive processes provide a framework that explains accomplishment and failure, educational outcomes, and career outcomes.

SCCT has been divided into two levels of theoretical analysis; the performance of cognitive person variables and the breakdown of the additional sets of variables that might influence career-related interests and behaviour. Staunton (2015) mentioned that choosing the best career or education program that fits the student's personality will lead to better career well-being, success-job satisfaction, good grades, and graduation on time.

Purpose of the Research

This study aimed to explore the perspectives of STEM senior high school students in pursuing science-related careers in the future. Generally, this study answered the following research questions:

- 1) What is the interest of the students in the STEM field?
- 2) Why do STEM students enroll under the STEM strand?
- 3) What career will the STEM students pursue after graduation?
- 4) Why do students pursue (or not pursue) a STEM-related career?

Methodology

Research Model

This research used a descriptive qualitative design. As a research tool, a descriptive qualitative approach is a qualitative research method that is used to discern who is involved and where do things take place in a specific phenomenon. A descriptive qualitative design focuses on the process of how things occur. Additionally, Koh and Owen (2000) emphasized that the descriptive qualitative approach centers on the attitude, beliefs, principles, and thoughts of how a person makes involvement out of their experiences as they interpret their involvement in a specific situation. Descriptive qualitative research highlights inductive reasoning, under the facts that the researcher seeks to boost hypotheses from observations where the researcher is the primary research instrument, and the researcher's perception is the vital instrument for the study (Koh & Owen, 2000).

According to Lambert and Lambert (2012), the purpose of qualitative descriptive studies is a comprehensive summarization, in conventional terms, of specific events skilled by using individuals or groups of individuals. To some researchers, such a qualitative format category does not exist. Unfortunately, this has pressured other researchers, especially beginners, to the methods of qualitative research, to experience they have to defend their research method by way of giving it epistemological credibility. This had led to the labeling of many researches as phenomenology, grounded theory, or ethnography, when in fact, these researches failed to meet the requirements of such qualitative approaches. The present study is descriptive qualitative research as it described the perspectives and experiences of Grade 12 STEM senior high school students in their career interest, motivation, and aspiration concerning STEM.

The role of the researchers in qualitative research is to attempt to access the thoughts and feelings of study participants (Sutton & Austin, 2015). In this research, the researchers sought to gather information about the perspectives of STEM students. First, the researchers collected data through a one-on-one interview. Second, they transcribed, analyzed, and interpreted the data gathered. The researchers used audio recording for data collection during the interview.



Then, they transcribed the recordings into written form. They kept the audiotapes and the transcripts into a secure folder and stored in a locked cabinet, as they contained sensitive information relevant to the research.

Qualitative research is about putting oneself in another person's shoes and seeing the world from that person's perspectives, the most crucial part of data analysis and management is to be true to the participants (Sutton & Austin, 2015). As a return, the participants answered sincerely in the interview. So, the information gathered was considered valid and reliable. The collected data were subjected to validation, which involved one research expert who checked and examined the transcripts for validity and accuracy.

Participants and Ethical Considerations

The participants of this study were 20 Grade, 12 STEM students, in a public secondary school in Zambales, Philippines. The study was conducted in the Schools Division of Zambales for the school year 2018-2019. The school offers two tracks in SHS, which include the Academic Track; and Technical, Vocational, and Livelihood (TVL) track. The Academic Track offers four strands, namely Accountancy and Business Management (ABM), General Academic Strand (GAS), Humanities and other Social Sciences (HUMSS) and Science, Technology, Engineering, and Mathematics (STEM).

The participants were chosen through purposive-convenience sampling. Purposive-convenience is also known as haphazard sampling or accidental sampling. This sampling technique refers to a type of non-probability sampling where the target participants meet specific practical criteria, such as easy accessibility, availability at the given time, or the willingness to participate are included for the study (Etikan, Musa, & Alkassim, 2016).

The selection criteria for the participants are the following: (a) currently enrolled in STEM strand under academic track; and (b) enrolled in Grade 12. The study did not include (a) Grade 11 students; and (b) students who enrolled in other strands. There are 10 female and 10 male participants aged between 16 to 19. The researchers interviewed the participants to explore their perspectives in pursuing STEM-related careers.

In qualitative research, ethical principles were primarily centered on the protection of research participants and the guided foundation of "do no harm." Researchers faced ethical challenges in all stages of the study, from design to reporting. These include anonymity, confidentiality, informed consent, researcher's potential impact on the participants, and vice versa (Speziale & Carpenter, 2011). In this research, the most important ethical considerations include the observance of respect for the decision making and dignity of the participants, minimization of the risks of the participants, and protection of the attributes of the participants. The effect of the researchers on the actual data collected were considered in this study as they also serve as research instruments (Peters, 2018).

Data Collection Tools

The structured interview guide served as the main instrument in gathering the data. The first part consists of the demographic profile of the participants, including their age and sex. The second part consists of nine open-ended questions that explored STEM students' reasons for choosing STEM and their career path that they intend to pursue after graduating from high school.

The interview guide was content validated by experts. Specifically, the following key questions were asked during the interview: (a) Are you interested in a STEM discipline? Why or why not?; (b) Why did you enroll in STEM strand?; (c) What career do you want to pursue after graduating from college?; (d) Why will you pursue or not pursue a STEM-related career?

Data Collection Procedure

The study was guided by the following procedures as shown in Figure 1.

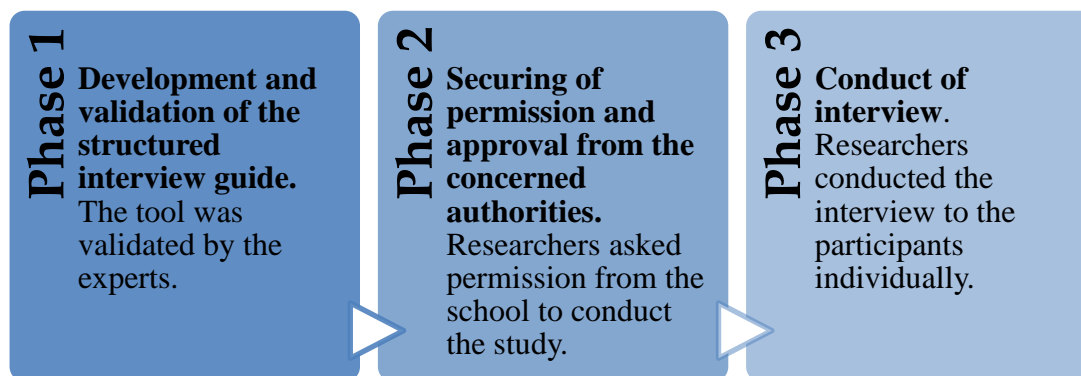


Figure 1. Data collection flowchart.

Data Analysis

The recorded interviews were individually transcribed to arrive at an extended text. Transcription of the tape recordings were done as soon as the interview concluded (Hatch, 2002). The participants' responses in the interview were translated to English for better understanding. The researchers did a manual coding of the responses and assigned broad code which serve as a basis for the generated themes. The code used was SS (STEM Student) followed by participant number then sex, e.g., SS7, Female.

The themes that emerged in the study were subjected to member checking procedure via interview that allowed the participants to be approached to ensure accuracy and consistency of transcription and interpretation (Lincoln & Guba, 1985). Through informal interview and member checking, the researchers assured the trustworthiness and truthfulness of the data collected.

Findings

Students' Interests in STEM field

Table 1 shows the students' interest in STEM field.

Theme 1. Interested in biology

Nine Grade 12 senior high school (SHS) students indicated that they are interested in biology. One participant said, "*May aspects lang po ng science like biology po* (There are only specific aspects which I like in Science specifically biology)." Another student also mentioned, "*Hindi po talaga ako mahilig sa chemistry, mga biology lang po* (I don't like chemistry, I prefer biology more)." This implies that almost half of the participants are more interested in Biology. They are more interested in the parts of the human body and biology-related experiments.

Table 1. Students' interest in STEM field

Theme	Significant Statement	Frequency
Interested in Biology	There are only aspects of science like biology. [SS7, Female]	9
Not really interested	I do not like it that much. Just a little bit. [SS5, Female]	6
Interested in Chemistry	Other fields such as biology and chemistry are okay with me. [SS17, Female]	3
Interested in General Science	Because science provides vast knowledge. [SS16, Male]	3
Interested in Earth and Space Science	Because it is interesting to study the solar system and the parts of the body or anatomy. [SS18, Male]	3
Interested in Physics	For me, Physics is so interesting. [SS4, Female]	2
Interested in Mathematics	Just a little, because I like mathematics. [SS1, Female]	1

Theme 2. Not really interested

Among the participants, six of them say that they are not really interested in science even they enrolled under STEM strand. One male participant said, “*kasi po yung ibang branches niya po ayaw ko*” (I am not interested in other branches). This implies that some of the participants are not really interested in science because they don't like the other branches of science.

Theme 3. Interested in chemistry

Three Grade 12 SHS indicated that they are interested in chemistry. One student said, “*Parang nandoon lang yung interest ko sa iba, halimbawa kapag ang pinag-uusapan namin about experiment, doon natutuon yung attention ko* (I think I just want an specific field of science, for example, when we talk about the experiment, it can get my attention).” This implies that only variant participants are interested in chemistry. Some of them are interested in doing chemistry experiments.

Theme 4. Interested in general science

Meanwhile, three of the participants indicated that they are interested in general science. Two of them said that since their elementary days, they already have an interest in general science. One student said, “*kasi po sa science malawak yung kaalaman* (Science has a wider knowledge).” Some of them said they gain their interest in general science when they are still in elementary.

Theme 5. Interested in earth and space science

Some of the students show that they are more interested in earth and space science. One participant mentioned “*kasi kapag sa solar system mga ganun at saka mga parts ng body, interesting siyang pag aralan*” (I am interested when the topic is all about the solar system and other celestial bodies). This implies that students can be attentive in the discussion of celestial bodies.

Theme 6. Interested in physics

As indicated by the participants, physics is more interesting than chemistry. Two of them preferred physics than chemistry. According to one of the participants, “*medyo dehado*

po sa chemistry (I lack conceptual understanding in chemistry).” This implies that only very few participants are interested in physics. They both said that they prefer physics than chemistry.

Theme 7. Interested in Mathematics

Only one of the participants shared that she is not interested in mathematics which is another STEM discipline. This implies that other students are interested in other STEM disciplines like mathematics, technology, and engineering.

Students’ Reasons for Enrolling in STEM Strand

Table 2 reveals the reasons of students in selecting STEM as their chosen strand.

Table 2. Reasons of students for enrolling in STEM strand

Theme	Significant Statement	Frequency
Alignment to the preferred course in college	I enrolled in STEM because it is inclined to the course in college that I am going to take. [SS15, Male]	10
Interest in STEM disciplines	In STEM, knowledge is broader than other subjects. [SS18, Male]	5
Peer influence	Influence only of my friends. [SS13, Male]	4
Quota of course issue	At first, I want to take accounting but when I transferred here, I took STEM instead because ABM (accountancy and business management) is not available. [SS8, Male]	1
Personal choice	It was my personal choice. [SS16, Male]	1

Theme 1. Alignment to the preferred course in college

Half of the participants cited that their reason for enrolling under the STEM strand is because it was aligned in their preferred course in college. One of the participants said she entered in STEM strand because she wanted to pursue Radiology Technician in college. This implies that in choosing strand in senior high school, it must be aligned to your desired course in college.

Theme 2. Interest in STEM disciplines

Five participants cited that STEM covers broader topics unlike other strands. One of the participants believed that, “*sa STEM po kasi mas wide yung knowledge kesa dun sa iba*” (One can have a broader knowledge in STEM). This implies that some students enrolled in STEM to advance and widen their knowledge of different STEM disciplines.

Theme 3. Peer influence

Peer has a significant impact on the career choice of the students nowadays. Results reveal that four participants stated that they chose STEM strand because of peer influence. This implies that peer influence can be a significant factor in a student’s career decision.

Theme 4. Quota of course issue

Quota course issue is also a factor why students choose STEM as their strand in senior high school. One of the participants shared his experience that he wanted to pursue accounting but the ABM strand was not offered in the school he enrolled in. This implies that there’s a student who enrolled in STEM strand because of quota course issue.



Theme 5. Personal choice

Only one of the participants enrolled under the STEM strand reasoned out personal choice. Interestingly, personal choice is not a common reason among the participants for enrolling in STEM course.

Students' Career Path after Graduating in College

Table 3 shows the career path that the students wanted to pursue after graduating in college.

Table 3. Careers that student wanted to pursue after graduating in college

Theme	Specific Career	Frequency
Engineering and technology	Civil Engineer	12
	Mechanical Engineer	
Non-STEM careers	Military	5
	Criminology	
	Psychology	
	Accountancy	
Medical and allied	Doctor of Medicine	2
	Nurse	
Mathematics	Bachelor of Secondary Education Major in Mathematics	1
Information Technology	Information Technology	1
Science	Bachelor of Secondary Education Major in Biological Science	1

Theme 1. Engineering and technology

Twelve participants in this research said that they want to pursue engineering and technology after graduating from college. Almost half of the participants show interest in engineering technology and show firmness they want to pursue it after graduating from college.

Theme 2. Non-STEM Careers

If the students are enrolled in STEM strand, it means that they also have the intention to continue a STEM career. However, five participants stated that they wanted to pursue a non-STEM career in the future. One of the students said that, "*parang interest ko lang yung science, pero ang balak ko talagang ipursue is military or criminology*" (In some way science is my interest, but my plan is to pursue military or criminology). It implies that some of the participants wanted to pursue a non-STEM career even if they majored in STEM.

Theme 3. Medical and allied

On the other hand, two participants choose to pursue medical allied as their career in the future. This career path includes doctor of medicine, nurse, medical technologist, and radiologist.

Theme 4. Mathematics

Only one of the participants wanted to pursue mathematics because he wanted to pursue degree in mathematics teaching. Careers in mathematics education are diverse and rewarding and are in demand especially in the basic education in the country.

Theme 5. Information Technology

One of the participants wanted to pursue information technology. It indicates that, despite being in the era of new technology, there is only one participant who wants to pursue career-related to information technology. Information technology discipline is an important area of study especially at the onset of Education 4.0.

Theme 6. Science

Another participant wanted to pursue science because he wanted to pursue a teaching career in science. Science education is an essential building-block of society's progress.

Students' Reasons in Pursuing or Not Pursuing STEM-related Careers

Table 4 presents students' reason in pursuing or not pursuing science-oriented careers.

Table 4. Students' reason in pursuing or not pursuing STEM-related career

Theme	Significant Statement	Frequency
Personal aspiration	Because that is my dream, I really want to be a Doctor to help my fellowman. [SS6, Female]	11
Family influence	(Because I was also inspired by my brother because he is good when it comes to electricity and also my dad.) [SS5, Female]	2
Better job opportunity	Because there are lot of projects in civil engineering. Not just here in the Philippines, but also in abroad. [SS15, Male]	2
Prospect for attractive compensation	I know that opportunity is better because of the high salary.) [SS1, Female]	1
Interesting field to study	I am really excited to take psychology because they study different things. [SS2, Female]	1
Financial constraint*	Because of financial problem.) [SS9, Male]	1
Relevant skills	I love to explain. For example, there is a topic, I feel happy to explain about it. [SS11, Male]	1
Service for one's country*	I want to fight to protect my country. [SS12, Female]	1
Desire to help the family	To help my family. [SS16, Male]	1
Preferred strand not offered	I should be in HUMMS but there is no HUMMS here so I took STEM, instead. [SS17, Female]	1
Influence of immersion	I really want to take civil engineering but an engineer advised me to take other area in engineering because there are so many civil engineer. [SS18, Male]	1
Inspired by teachers	I help my STEM teacher, so maybe that is the reason why I got inspired. [SS20, Male]	1
Peer influence	I want mechanical engineering because of influence of my friends. [SS17, Female]	1

*Reasons for not pursuing STEM-related careers

Theme 1. Personal aspiration

More than half of the participants have chosen STEM because this is their personal preference. Their passion and goals in life pushed them to do pursue what they want. One of the participants said that, "*Kasi po pangarap ko po yun, gusto ko po talagang mag doctor para makatulong sa kapwa ko* (This is my dream, I really want to be a doctor because I wanted to help my countrymen)."

Theme 2. Family influence

Family serves a significant influence on the life and career development of the students. Family can shape their perceptions in choosing a specific career. Some of the students rely on their families when they decide on their life. Two participants were inspired by their family to pursue their preferred careers.

Theme 3. Better job opportunity

Students in this generation are pragmatic when it comes to their future plans. In choosing their future career, they prefer to choose a career that fits their strengths and interest. Furthermore, they pursue career that will give them the best opportunity to succeed in their life. Two participants took up STEM to land on a better job. One of them shared, “*Kasi po marami po siyang project yung civil engineering. Hindi lang po dito sa Pilipinas, kung hindi pati na din po sa abroad (Civil engineering is so in demand. Not only in the Philippines, but also in other countries).*” It suggests that the participants are mindful of having a better job opportunity to raise their family from poverty and augment their family income.

Theme 4. Prospect for attractive compensation

Salary is one of the reasons why students choose a better course or a career to pursue. One participant emphasized that, “*Alam ko pong mas maganda yung opportunity dahil nga po sa sahod na din po* (I know it will give me a good opportunity because of a high salary).” This implies that some students pursue career fin STEM due to attractive salaries.

Theme 5. Interesting field to study

One participant decided not to pursue STEM-related course because she is interested in other disciplines. This implies that not all students who enrolled under STEM strand will pursue a STEM career.

Theme 6. Financial constraint

Lack of money can limit and control a person’s decision in life. One of the participants cannot continue his chosen career because of monetary constraints. Financial constraints can be a potential challenge for the students in finishing their career paths.

Theme 7. Relevant skills

Skills and capabilities are beneficial to students as these give them the confidence to perform the things entailed in their chosen fields. One participant will pursue his chosen career because his skill fits the job he wanted to take. This indicates that skill can be an essential factor in pursuing a career. In choosing a career, suitability to the interest of the students is given utmost importance.

Theme 8. Service for one’s country

One of the participants decided not to pursue military training, a non-STEM career, because of the need to serve her country. The participant shared her perception that “*Gusto ko pong makipaglaban para sa bayan* (I want to fight for the glory of my country).”

Theme 9. Desire to help the family

Interestingly, one student indicated his desire to help this family as one of the reasons why he pursue career in STEM. This may suggest that Filipino students pursue college education mainly to help their families.

Theme 10. Preferred strand not offered

One participant enrolled in STEM because her preferred major is not available. The participant indicated that, “*Hindi po talaga mechanical engineering yung gusto ko po. Gusto ko po talaga hotel and restaurant management (HRM) (Mechanical engineering is not really my choice. I want to take HRM).*” This infers that personal preference is sometimes sacrificed due to the unavailability of the program in the school.

Theme 11. Influence of immersion

Due to immersion, one participant will likely pursue STEM-related career. The student said that he will pursue engineering because he was inspired by the engineers he met during the internship program which is part of their curriculum. Social environment can be an influential factor in career path of the students.

Theme 12. Inspired by teachers

Teacher touch the hearts and minds of the students. One participant shared that “*Sa akin pinapagawa yung gawain ng teacher kaya siguro ano, nainspire po ako* (I was inspired by my teacher because my teacher let me do the paperworks).” Her statement indicates that teaching can be an attractive career for some students as they see their teachers as role models.

Theme 13. Peer influence

Some of the students rely on their friends for their future plans. One participant said, “*Impluwensiya din po ng mga kaibigan ko yung Mechanical Engineering* (I want to take mechanical engineering because of the influence of my friends).” His statement clearly shows that peers can influence one’s decision in choosing a career.

Discussion

The study determined the perspectives of the senior high school students in their selection of STEM discipline as their career path after graduation. For the first research question on their interests in STEM field, majority of them are interested in science-related disciplines such as biology, chemistry, physics, and earth and space sciences. According to Laut, Bartolini, and Porfiri (2015), students are more interested in pursuing STEM careers and have a better understanding of the relationship because they have participated in the program. Lack of interest can be the effect if the content taught is not relevant to everyday life (Akram, Ijaz, & Ikram, 2017).

Most of the participants are interested in biology and very few in physical sciences like physics and chemistry. The interest of the students in chemistry courses can be increased through the support of the chemistry teachers (Akram et al., 2017). Ivey, Colston, and Thomas (2015) averred that to be able to achieve the desired outcome, there is a need to promote a great concept and knowledgeable ideas of how space explorations will benefit society and contribute to the



innovation of STEM. Moreover, there are different factors affecting STEM career interest, such as academic achievement, family support for mathematics and science, and gender (Hazari et al., 2017). A total of 40% of the students who is planning to pursue engineering and science major end up switching to other subjects (Drew, 2011).

For the second research question, participants were asked of their reasons for enrolling in STEM strand. Five themes emerged from the participants' responses. These themes include alignment to the preferred course, interest in STEM disciplines, peer influence, quota of course issue, and personal choice. Most of them responded that they enrolled because STEM is aligned to their preferred course in college. Intentions of pursuing a STEM career in college can be triggered by an individual's knowledge in STEM career (Compeau, 2016; Nugent et al., 2015; Zhang & Barnett, 2015). Choosing STEM career is the effect of a student's career interest and their preferred future career activities (Blotnicky, Franz-Odenaal, French, & Joy, 2018). Moreover, students' interest in STEM disciplines is another reason why the students enroll in STEM. Interest is a crucial factor in the field of science education because from the last two decades of the 20th century, this concept expanded in the field of science educational societies (Akram et al., 2017). Furthermore, science education is a quintessential component of economic progress and self-sufficiency, and an impetus for sustainable development (Rogayan, & Macanas, 2020).

Peer influence also surfaced in the study as one significant reason. Friends or peer influence can affect student's decisions in choosing courses because this is their way to feel accepted in the group (Ouano, Torre, Japitan, & Moneva, 2019; Robnett, & Leaper, 2013). Since schools limit the number of students enrolling in the different programs or the quota course policy, not all students can enrol in their preferred course. Quota students in STEM disciplines routinely reported having failed their core math and science courses during the first year and experiencing difficulty with others as they matriculate. This was attributed mainly to the fact that they entered with a lack of a strong academic base. Additional barriers students faced were a lack of finances and a lack of family support and cultural capital. While the university has implemented various financial supports to address quota students' needs, they lack structured academic supports such as bridge programs, supplemental instruction, and tutoring (Childs, 2015). Nowadays, we need to consider how students can be actively engaged in making their own education because improving students' interest in science alone might not lead to attracting more students in choosing science. In this way, we can support them in making personal sense (Holmegaard, 2015).

Students' career path after graduating from college is the focus of the third research question. Based on the analysis of the interview transcripts, six themes emerged. Students will pursue careers in engineering and technology; medical and allied-related; mathematics; information technology; science; and non-STEM career. Majority of the students chose engineering and technology fields. Values play a vital role for every student who chooses to become engineers, that is why we need to focus on values to increase their persistence rates, especially in helping them to connect their personal identities to engineering identities (Matusovich, Streveler & Miller, 2010). Students must also be equipped with the necessary scientific skills as they enter the professional workforce (Rogayan, 2019).

Some of the students are also planning to take course not related to STEM such as psychology and accountancy. About half of adults (52%) say the main reason young people don't pursue STEM degrees is they think these subjects are too hard (Kennedy, Hefferon & Funk, 2018). Only a few would pursue medical and allied fields, mathematics, information technology, and science teaching. Health care as a composite whole can only be improved if human resources

for nursing and allied health services are nurtured and enhanced through education in a systematic and planned manner (Jadhav, Yeravadekar, Shrivastava & Kulkarni, 2013). According to Duke University (2019), employers correspondingly value skills as well as capabilities developed as an outcome of the preparation to be mathematics major. Mathematics is a challenging and demanding intellectual pursuit and it is also an interesting, exciting and challenging major.

Some participants also mentioned that they will be taking information technology and science teaching degrees. The most commonly known profession and the fastest developing industry is the information technology or more commonly known as I.T. in all over the world (Florida Career College, 2018). Meanwhile, teaching may not be a profitable career, but it has been regarded as a great job that contributes mainly to non-material satisfaction to people who are engaged in it (Rogayan, 2018).

For the fourth research question, the participants were asked of their reasons for pursuing or not pursuing a STEM-related career. A total of 13 emerging themes were identified in this research question. The students will pursue a STEM-related career because of personal aspiration, family influence, better job opportunity, prospect for attractive compensation, interesting field to study, relevant skills, desire to help the family, preferred strand not offered, influence of immersion, inspired by teachers, and peer influence. On the other hand, they will not pursue a STEM-related career due to financial constraints and service for one's country.

Most of them cited that pursuing a STEM career is due to personal aspiration and family influence. STEM career aspirations of the learners have increasingly received attention all over the world (Lee, Capraro & Viruru, 2018). Many young people grow up dreaming similar to their parents' profession (McQuerrey, n.d.). There is nothing wrong with it, especially if the child really wants that dream. Family belonging incorporates approaches of inclusion within the family member, as well as feelings of being understood, of having fun together, and of being paid attention (King & Boyd, 2016). The love that comes from a family is the reason why a person wants to give back the good things that they gave by means of helping them financially.

Those learners who take STEM strands are preferable to be employed and stick to one full-time job instead of having a part-time job or multiple jobs after their study (Jacobs, 2014). According to Jacobs (2014), learners who are studying science and mathematics in college have a greater chance of employment and higher salary rate than the other field after graduation. Utilizing the biggest influence on STEM entrance, intending to major in STEM is directly affected by 12th-grade math accomplishment, exposure to math and science courses, and math self-efficacy philosophies (Wang, 2013).

Meanwhile, the lack of money is one of the major problems of the students to achieve their dreams in life (Dang, 2015). It is sad to think that some children do not achieve their dreams because of this problem. Some of them stop studying and just working. It is also important for the learners to know what course to pursue in college, their choice should be their interest and it must fit their abilities so that it will not give them a hard time choosing the right career path (Penedilla & Rosaldo, 2017).

In this study, service for one's country, although a positive reason, was cited as a reason for not pursuing a STEM career. The participant would like to serve the country through military service which is not a STEM-related career. Patriotism is a great thing that one person can do for their country.



According to Biliran (2018), one should not compare one strand to another because no strand is beyond the other strands, and one should not look down on a particular strand even though it seems easy. Learners of each strand experience diverse challenges and each of them have different ways to deal with these problems. MohrSchroeder et al. (2014) said that informal learning environments boost student's awareness and interest in STEM as well as the chances that the students will pursue STEM career (Kitchen, Sonnert, & Sadler, 2018).

Teachers and peers also influence students why they pursue STEM careers. An example of a persons who play the role of catalyst in the talent improvement process of the learners are the teachers (Margot & Kettler, 2019). The influence of the peer is much greater among adolescents than adults when it comes to decision making (Steinberg & Monahan, 2007).

In this research, it is very evident that majority of those who enrolled in STEM courses will likely pursue a STEM-related career in the future. The very reason why they enrol in the program is that they see it as a preparatory program for the courses that they would take at the tertiary level. Personal aspirations and family are strong influences in the students' choice of a STEM career.

Conclusions and Recommendations

The study focused on the perspectives of the students in choosing STEM and pursuing STEM-related careers. Generally, senior high school students are interested in biology. Alignment to the preferred course in college is the primary reason of the participants for enrolling STEM. Almost all students wanted to pursue STEM-related careers after university graduation. The participants' personal aspiration is the main reason for pursuing a STEM-related career.

The study recommends that senior high schools may design various activities during the career week. These activities may include possible career path in STEM-related courses, students' career, and motivation, and their career aptitude. Schools may also conduct career guidance seminars for the students to be able to know what strands they may take to avoid quota of course issues. The Department of Education (DepEd) may support the implementation of different programs regarding the career preparation of the students. This program will help the students to be more aware of what career path they may pursue later and to avoid pressures from peers and other people.

The school administration may likewise conduct orientation about STEM and its demands to the different industries and how STEM professionals can contribute to the growing economy of the country. DepEd may provide seminars orientation to STEM teachers regarding career preparations of the students. In this way, teachers will be trained in career coaching to assist students in preparing their career which is appropriate to the interest and skills.

Since personal aspiration and family are the strongest influence of the students in pursuing a STEM career, it is recommended that personal development programs and family mentoring sessions may be conducted to guide students in their career selection better. A collaborative, authentic, and goal-oriented learning environment concerning the demand of Industrial Revolution 4.0 must also be strengthened.

Limitations and Future Directions

Further studies may be done to explore other dimensions of career choice of STEM students. Also, career path of freshmen STEM tertiary students may be explored to see if they will pursue STEM-related careers after graduating from college. The findings of the present study are subjected to several limitations. The perceptions of the STEM students in the chosen research site may not indicate generalizability. This means that the perceptions of the STEM students may not be accurate to other STEM students in other senior high schools in the Philippines. Future researchers may employ qualitative-quantitative research design to further validate the derived perceptions of students in pursuing STEM-related career. A further study involving larger population is likewise recommended.

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