Interest of Junior High School Students towards STEM Careers

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Abstract: STEM-skilled individuals are perceived to be paramount engines of prosperity in both developed and developing countries. Studies have revealed that multiple factors significantly contribute to students' STEM career interests. Junior high school (JHS) years allow students to spontaneously explore various fields. Thus, the goal of the study is to assess public junior high school students' interests in STEM careers. A survey on the environmental factors, STEM self-learning efficacy, perception of STEM careers areas. The study was conducted among 430 junior high school students from 9 public schools in the Philippines. Results from this study show that public junior high school students have relatively low self-learning efficacy in science, engineering, and mathematics. Low interest in STEM careers was attributed to insufficient STEM learning experiences and inadequate STEM self-learning efficacy. The findings also indicate that environmental factors, STEM self-learning efficacy, and students' perception of STEM careers are significantly and positively linked to students' STEM interest.

Keywords: STEM; STEM interest; STEM careers; STEM perception; self-learning efficacy

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INTRODUCTION

The outbreak of the COVID-19 pandemic resulted in a huge disturbance not only in the educational system but even in the worldwide economy. The need for skilled individuals in the sciences and mathematics has become more prominent than ever. There have been global initiatives to encourage more individuals to enter professions related to Science, Technology, Engineering, and Mathematics (STEM). It is logical that such effort will begin in the educational system in which students are already introduced to STEM courses in the hope of eventually enticing them to take these programs.

The premise of STEM education is to empower the STEM workforce with skilled human capital that is capable of commercialization, innovation, and research (Kier et al., 2014). As emphasized by Uttal and Cohen (2012), the STEM principles focus on finding answers to global problems and developing project-based education systems. With this, the demand for STEM graduates is extremely high, yet the interest of students in STEM careers is decreasing (Bottia et al., 2015). This problem is evident in the Philippines where the proportion of students interested in STEM careers is not enough to fill the demands of the country in the future (Business World, 2021). Nonetheless, the Philippines is not the sole country to experience this problem. For example, in the USA, difficulty filling the country's demand for STEM-skilled workers as a result of the scarcity of participation in STEM fields is reported (Wyss et al., 2012). Turkey is in a similar situation, with STEM-related jobs accounting for 18% of all national vacancies in the country (Bahar & Adiguzel, 2016). On the other hand, as stated by English (2019), countries with well-developed communities and a relatively small population excel in the field of STEM. Some of these countries are Israel, Ireland, Singapore, and Germany. Israel consistently ranks high in terms of technology, research, and innovation (Minnen & Kirsch, 2016). In addition, Israel has begun to introduce STEM in kindergarten through middle school to boost scientific thinking and prepare the children for their adult lives and future technological jobs (Schiller, 2021). To attract more people in the field, Ireland invested millions, which funded projects that are dedicated to educating and engaging the general public in STEM (Science Foundation Ireland, 2019). Unlike Singapore, which also starts its STEM curriculum as early as pre-school, Germany focuses on output-based teaching to equip its STEM professionals. College students' internship programs in Germany are exceptional in giving the needed experiences to students in engineering and technology (Schaeper, 2009).

The vast majority of innovations that improve people's lives are the result of contributions from STEM-related fields (Kuenzi, 2008). This is because STEM careers are among the most versatile and crucial in today's world. The developments in the field are responsible for the majority of new inventions that improve the world's quality of life (Hossain & Robinson, 2012). As stated by Peri et al. (2015),

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COMMON GROUND

STEM jobs have a substantial influence on innovation and productivity growth in the majority of advanced economies. In fact, according to Zilberman and Ice (2021), STEM professions are expected to increase at a rate more than twice that of the total number of jobs over the next ten years. Yet, despite the high employment demand for STEM-skilled individuals, STEM workers are widely perceived to be in short supply (Cappelli, 2015). In addition, the number of proficient US citizens working in the field is declining (Hurtado, 2010). According to Sanders (2004), as stated in Hossain and Robinson (2012), foreign scientists, mathematicians, and engineers make up a significant share of the STEM workforce in the US. This is one of the reasons why the Philippines does not have enough engineers and scientists to date. As stated by Roan-Cristobal (2019), a country of 104 million people requires a minimum of 39,520 science and technology-skilled individuals in sectors to keep the economy running and promote the well-being of its citizens. However, the Philippine Statistics Authority (2020) reported that last 2019, there were about 2.2 million Filipinos working in foreign countries. More than a quarter of Filipino workers working abroad devote their lives to caring for the sick (Caulin, 2018). In the US alone, 150,000 Filipino nurses are on the front lines during the recent pandemic (Ladrido, 2020).

According to the 2009 Freshman Survey, 34% of White and Asian American students expressed interest in pursuing STEM careers in 2009 (Hurtado, 2010). Concerns arise when students who graduated from the STEM strand opt to enroll in non-STEM courses in college. A more serious issue arises when the majority of students who plan to major in STEM when they enter college eventually transfer to a non-STEM program or drop out (Chen, 2011). This decline in student interest in STEM-related courses was backed up by Drew (2011). He claimed that approximately 40% of students who want to study engineering and science end up taking non-STEM courses. This is because there is insufficient family support in science and math subjects, as well as gender and academic achievement (Hazari et al., 2017). Therefore, encouraging students to pursue STEM courses in college should begin in junior high, when they are free to explore various fields. Students' curiosity in STEM jobs at the beginning of high school significantly contributes to their interest at the end of high school (Sadler et al., 2012). Despite this, recent studies have revealed that students in junior high school have a hazy understanding of science and engineering, despite the fact that these years are critical in developing a strong STEM interest (Compeau, 2019). In the US, junior high school students typically range from 12 to 15 years old, but the promising attitude of students at the age of 10 sharply declines by the age of 14 (Tai et al., 2006). The vast majority of secondary school students are exposed to abstract and theoretical science and mathematics with little application to their daily lives (Freeman et al., 2014). Van Houte et al. (2013), as stated by Heleen and Vandamme (2016), mentioned that students have little or no experience resolving multidisciplinary math and scientific problems due to the complexity of STEM-related disciplines. Consequently, students are unaware of the significance of STEM classes. To address the scarcity of STEM students, universities and governments around the world prioritize attracting skilled students (Agamata & Alvin, 2018). As a result of the US' willingness to devote more resources and time to STEM education, there is a dramatic growth in the amount of foreign students and employees in these fields (Planty et al., 2009). With the implementation of the Kinder to Grade 12 Program (K-12 Program) starting in the academic year 2016-2017, the Philippines has joined its neighboring countries in providing a more competitive educational system in the global context. This has created an opportunity to satisfy the country's continuous call for STEM experts since one of the aims of the program is to produce STEM experts. Also, to attract more students in the field, Republic Act No. 7687, also known as the "Science and Technology Scholarship Act of 1994," offers grants to gifted and worthy scholars whose families' socioeconomic status does not surpass the predetermined cut-off values. Qualifiers are obliged to concentrate on priority areas for basic sciences, other applied sciences, engineering, mathematics, and science teaching (Department of Science and Technology, 2018). The Department of Science and Technology – Science Education Institute (DOST-SEI) requires its scholars to serve in the country as a return service in their specialty areas for a period of time equal to the proportion of years they acquired the scholarship (Department of Science and Technology, 2020).

A variety of factors influence students' STEM career choices, the majority of which are due to environmental, familial, and intrinsic factors (Kuechler et al., 2009). Song and Glick (2004) claimed that students' perceptions of potential careers and earnings could influence their enthusiasm for STEM careers. Archer et al. (2012) found that students' STEM career interests and aspirations are aroused by exposure to the environment and curriculum at school that actively promote participation in scientific activities or STEM. When developing skills required for STEM-related jobs, effective teaching and learning strategies are therefore essential in the school environment (Halim et al., 2018). Moreover, as stated by Halim et al. (2018), social influence contributes to students' STEM career interests because those closest to the student, such as friends, teachers, role models, family members, and parents, have a significant impact on their career choices. Previous research has shown that students' parents are the most influential people in STEM-related job decisions (Nugent et al., 2015). Parents have a significant influence on their children's lives, including career choices in their early years (Cridge & Cridge, 2015). Students' formal education support is also important in piquing students' interest in STEM careers. Educators act as mentors or role models, fostering students' self-efficacy and own interest in STEM fields (Cridge & Cridge, 2015; Sahin et al., 2015). The teaching methods and the quality of the teacher have a huge influence on students' achievement, interest in the sciences, as well as their aspiration for STEM careers (Nugent et al., 2015). Even media such as newspapers, the internet, scientific magazines, movies, books, and science-related television programs can influence students' interest in STEM careers (Cavas, 2011). In addition, video interviews with STEM-skilled individuals, as a means of providing relevant STEM job information, have a promising impact on student engagement in STEM fields (Wyss et al., 2012). Media disseminates STEM information more quickly, allowing students to explore STEM knowledge in an easy and enjoyable manner (Halim et al., 2018).

As stated in Hossain and Robinson (2012), numerous high-STEM-ability students do not recognize their inherent STEM talents in high school and drop out of the STEM path in college because of insufficient support and inappropriate motivation. There are numerous magnet STEM programs throughout the world that are extensively accountable for improving the proportion of talent coming from the public school system. However, these programs are not constantly accessible to low-income students, and a number of them are reduced because of limited budget constraints. According to Wasserman (2008), as quoted in Hossain and Robinson (2012), retaining and improving the students' high-school STEM experiences is less difficult than recruiting new students. More often than not, the potential and talent of public high school students are overlooked, under-utilized, and underdeveloped. As a result, some government leaders in the US discovered an extremely low level of interest among high school students in participating in STEM related career activities in public schools; however, the students demonstrated promising interests in literature, arts, business, and careers in the entertainment industry. Therefore, it is deemed necessary to determine the aspects that discourage students from pursuing STEM-related careers. Since the most recent survey of Filipino students' interest in STEM careers was conducted prior to the pandemic, the effects of the sudden shift in lesson delivery to distance learning (such as modular learning, online learning, and blended learning) on students' STEM interests must be evaluated. A thorough examination of the factors that discourage junior high school students from pursuing STEM-related careers must be conducted in order for the necessary actions to be taken to address the country's scarcity of STEM professionals. Identifying the factors that contribute to STEM interest will then provide guidance for effective interventions while also contributing to many people's understandings of how students learn STEM content and develop STEM career trajectories.

Study Objectives

The study aimed to explore the interest of junior high school students towards STEM careers. In particular, this study aims to address the following research objectives:

1. Describe the extent by which environmental factors influence the interest of students towards STEM careers.
2. Describe the STEM self-learning efficacy of the students.
3. Describe the perceptions of the students toward STEM careers.
4. Describe the interest of the students towards different STEM subject areas.
5. Determine if there are significant differences between the environmental factors, STEM self-learning efficacy, perception of careers, and interest towards STEM courses across the students' demographic profile.
6. Determine if there are significant relationships between the environmental factors, STEM self-learning efficacy, perception of STEM careers, and interest towards STEM courses.

REVIEW OF RELATED LITERATURE

STEM as a Strand

According to Orbeta et al. (2018), the goal of proponents of K-12 laws is for senior high school (SHS) graduates to have better job opportunities even if they do not plan to continue their education right away. In comparison to other strands, the STEM strand concentrates on advanced concepts and topics. Students in this strand are expected to become pilots, astrophysicists, architects, biologists, engineers, chemists, dentists, nutritionists, physicians, nurses, and other STEM professions (Bolds, 2017). According to Simpkins et al. (2006), as stated in Blotnicky et al. (2018), the middle school years are the key stages that greatly influence students to strengthen their interest in STEM careers. Therefore, primary education indeed contributes well to developing STEM career aspirations. However, according to Albert (2016), the Philippines is still problematic with the number of out-of-school children because of health, economic, and psychological factors, especially in public high schools. The study even reported that a significant number of children mentioned “lack of interest” as their primary reason for not attending school. In fact, about 36% and 44.1% of students highlight that their reason for not attending primary and secondary levels, respectively, is a lack of interest. In addition, 14.1% and 29.4%, respectively, pointed out that the "high cost of education" hinders them from attending primary and secondary schools. These reports clearly show that the Department of Education (DepEd) has to double their efforts to resolve the issue of the decreasing number of students' attendance to produce a more competent and sufficient number of graduates and skilled workers in the future.

A large majority of secondary school pupils experience abstract and theoretical mathematics and science with little application to their everyday lives (Freeman et al., 2014). Van Houte et al. (2013) as stated by Heleen and Vandamme (2016), due to the complexity of STEM-related disciplines, students have little or no experience in resolving multidisciplinary math and scientific problems. As a result, students fail to understand the importance of STEM classes. To aid the shortage of students going to the STEM strand, universities and governments around the world prioritize attracting skilled students into the STEM strand (Agamata & Alvin, 2018). As the United States (US) invests more money and efforts to boost STEM education, a dramatically expanding number of international students and employees in these disciplines is evident (Planty et al., 2009).

Rask (2010) mentioned that in terms of the motivation of the person and future career potential, the STEM program is costly. However, because of insufficient scholarship programs, lack of family support, and many other factors, a huge amount of STEM students are not able to finish their chosen STEM careers (Rafanan et al., 2020). Another barrier that students face is the quota course policy that results in their not being able to enroll in their preferred course. Routinely, quota students in STEM courses fail their science and math core subjects in their first year of college and continue to experience difficulty as they matriculate (Ouano et al., 2019).

STEM as a Profession

In most advanced economies, STEM jobs contribute significantly to innovation and productivity growth (Peri et al., 2015). Despite the high employment pay for STEM students, STEM workers are generally perceived to be in short supply (Cappelli, 2015). A possible reason for this, as stated by Kennedy et al. (2018), is that about 52% of American adults claim that the subjects in STEM degrees are too difficult, which is why young people do not pursue them.

STEM-related industries in the US have also been relatively focused on increasing the number of students participating in STEM education (Baber, 2015). Consequently, according to Anito and Morales (2019), STEM graduates in the Philippines are low in numbers; therefore, the country has an insufficient number of scientists. Per million, the Philippines has only 189 scientists, which is far way beyond UNESCO's recommendation of about 380 scientists per million (Anito & Morales, 2019). The insufficient number of scientists in the country is mainly due to STEM-related low graduation rates. In fact, the report from the Commission on Higher Education, validated by EduTECH (2016), showed that, based on a 5-year data set, the completion rate for STEM areas was only about 21.10% until the academic year 2016-2017.

According to Powers (2018), the advent of technological innovation transformed the world and changed STEM's career landscape, especially in academe. Over the last half a century, STEM-skilled people have mostly worked for the same company for 40–50 years, yet because of the freelance opportunities today on the internet, employees switch jobs every 2-3 years. However, a lot of factors contribute to an employee's tenure. The National Science Foundation (2015), as stated by Korte et al. (2019), reports that more than 50% of the people in the US earning STEM degrees do not actually work in STEM occupations.

Interest towards STEM courses and careers

As indicated by the 2009 Freshman Survey (Hurtado, 2010), white and Asian American students tallied an average interest of 34% in STEM careers. A significant number of cases caught the attention of society when students graduating from the STEM strand started to choose a non-STEM course upon enrollment in college. Yet, a more serious problem is when most students who entered college pursuing STEM-related careers eventually shift to a non-STEM program or drop out of school (Chen, 2011). A claim by Hurtado (2010) specified a loss rate of about 20% to 50% happening in STEM disciplines. This downfall in the interest of students in taking STEM-related courses was supported by Drew (2011). He stated that about 40% of students who are initially planning to take science and engineering majors end up taking non-STEM courses. This is because of family support in science and math subjects, gender, and academic achievement (Hazari et al., 2017).

In the study of Cheng and Soldne (2014), in the years 2003–2004 in the US, only about 28% of college students and 20% of associate's degree students actually entered STEM fields. From among the college students, those interested in finishing biological or life science courses have the highest number. On the other hand, the physical sciences and mathematics are the two least populated fields. In the study of Chen (2011), it was revealed that students who were interested in STEM during high school actually took engineering and engineering technologies, natural and applied sciences, computer/information sciences, mathematics and statistics, and biological and agricultural sciences. Yet, the attrition rate in STEM fields is alarming with 28% among college students while and 33% among associate's degree students (Cheng & Soldner, 2014).

A lot of factors influence students' STEM career choices, e.g. environmental factors, background, and intrinsic factors (Kuechler et al., 2009). Song and Glick (2004) claimed that students' perception of their potential careers and potential earnings could influence their interest in STEM careers. In fact, according to Funk and Parker (2018), there has been a 79% improvement in STEM occupation employment since 1990; an increase from 9.7 million to 17.3 million has been recorded in the US. Additionally, STEM-related jobs have a median salary of $38.85 per day as compared to the $19.30 of non-STEM occupations (Education Commission of the States, 2017). A recent survey conducted by Emerson Electric Co. (2020) revealed that about 91% of Filipino students are interested in taking up STEM-related courses and 80% of them are encouraged to actually pursue them. Yet, as stated by The Manila Times (2019), the Department of Labor and Employment claims that 3 out of 10 young job applicants need further training and seminars to be fully employable. A possible reason for this is the technological change that happens constantly. This allows the birth of new jobs with skills that make the old ones obsolete (Deming et al., 2018).

In the year 2016, out of 645,973 university graduates in the Philippines, about 12% or 76,432 obtained their degrees in engineering, 1% or 6,828 obtained science degrees, and only 2,736 or 0.4% are mathematics graduates (Oxford Business Group, n.d.). With the implementation of the K-12 curriculum, the Philippines is hoping to produce more STEM professionals who are globally competent (Franco-Velasco, 2012).

Archer et al. (2012) contended that exposure to a school curriculum and environment that actively promote participation in scientific activities, or STEM, arouses students' STEM career interests and aspirations. Effective teaching and learning strategies are, therefore, essential in the school environment when developing skills required for STEM-related jobs (Halim et al., 2018). As stated by Sahin et al. (2015), teaching and learning strategies that could enhance skills in the STEM areas include problem-solving, hands-on activities, daily applications of science content, cooperative learning, research activities, group work, and active learning. For instance, to increase students' STEM interests, informal science learning was identified as one of the most effective opportunities to begin with (National Research Council, 2011). Robelen (2011), as cited in Sahin et al. (2015), mentioned that after-school clubs, museums, zoos, and academic competitions such as Science Olympiad as examples of informal STEM learning opportunities. Informal STEM benefits include receiving informal coaching, learning in a fun way, applying science and mathematics simultaneously, increasing participants' confidence in essential STEM skills, and emphasizing camaraderie among students. These skills are essential for developing a competent workforce in the field of STEM in the future (Denson & Carolina, 2015).

Moreover, as stated by Halim et al. (2018), social influence contributes to students' STEM career interests for those individuals closest to the student, such as friends, teachers, role models, family members, and parents, who significantly influence them in choosing their career paths. Previous research has proven that in STEM-related job decision-making, the most influential people for students are their parents (Nugent et al., 2015). Parents play a huge role in their children's lives, including career choices in the early stages of life (Cridge & Cridge, 2015). Also, the attitude of the family members towards science or STEM careers influences the choices of students (Archer et al., 2012). Students' interest in STEM careers can be influenced by family members such as siblings and relatives. A reason for this is that students can learn from them and gain a better understanding of the lives of family members who are inclined towards STEM fields (Halim et al., 2018). Students' support acquired from formal education is likewise critical in attracting students' curiosity in STEM careers. Educators serve as mentors or role models, cultivating interest and self-efficacy in STEM (Cridge & Cridge, 2015; Sahin et al., 2015). Students' achievement, interest in science, and aspiration for STEM careers are all heavily influenced by the teaching methods and the quality of the teacher (Nugent et al., 2015). Friendship also influences one's thinking and it is essential in developing great expectations in STEM careers (Cridge & Cridge, 2015; Stake & Peterson, 2012). Peers who prefer science subjects are more motivated and intelligent than those who prefer humanities subjects (Taconis & Kessels, 2009). School counselors are similarly necessary in helping students think about their career options (Hall et al., 2011). In schools, students converse with their teachers and counselors about their career options. However, the number of counselors who have enough expertise or information about STEM careers is only about 10%. As a result, if school counselors do not have enough knowledge about career options, many students will not consider STEM careers (Halim et al., 2018).

Even media such as newspapers, the internet, scientific magazines, movies, books, and science-related television programs may influence students' interest in STEM careers (Cavas, 2011). In addition, video interviews featuring STEM-skilled individuals as a means of providing relevant job information in

STEM, greatly contribute to students' engagement in STEM fields (Wyss et al., 2012). Media disseminate STEM information faster, in a way that allows students to explore STEM knowledge easily and have fun (Halim et al., 2018).

Aside from the aforementioned environmental factors that influence STEM career interest, another notable sources of STEM interest are STEM self-learning efficacy and perceptions of STEM careers, as claimed by many literatures. Self-efficacy affects decision-making in terms of choosing goals, exerting effort to achieve those goals, and remaining persistent when challenges arise (Bandura, 1977). In self-efficacy evaluations, respondents are asked to judge their level of confidence in achieving a particular goal (Beier & Rittmayer, 2008). As specified by Bandura and Locke (2003), the degree of motivation for a task and, ultimately, work engagement, are both strongly predicted by self-efficacy. It has been proven that students aspire to careers they are assured of their abilities than to those in which they are insecure about their performance and skills (Nugent et al., 2015). In general, those with high STEM self-efficacy are more likely to enroll in STEM programs, persevere longer, and succeed in such programs than people with low STEM self-efficacy (Sakellarioua & Fang, 2021). Consequently, indulging students with relevant information and content about STEM careers should start in elementary (Tran, 2018). Since it is believed that a child's STEM distinctiveness is formed by their perceptions of whether or not they think they meet the requirements to be part of the STEM community (Kim et al., 2018). Students' perceptions of STEM careers are also influenced by their inside and outside school activities and environments. According to research, students who have positive perceptions of STEM develop a curiosity in latent STEM careers during high school (Christensen & Knezek, 2017).

STEM in the junior high school curriculum

According to Sadler et al. (2012), students' interest in STEM careers at the beginning of high school significantly contributes to their interest at the end of high school. Despite this, recent research has revealed that students in junior high school have a hazy understanding of science and engineering, despite the fact that these years are critical in developing a strong STEM interest (Compeau, 2019). Typically, junior high school years in the US range from 12 to 15 years old, yet the promising attitude of students sharply at the age of 10 drastically declines by the age of 14 (Tai et al., 2006).

As stated by Roberts (2012), embedding STEM curriculum is feasible at a junior high school. The embedded STEM curriculum is conducted without restructuring the curriculum; hence, engineering, technology, science, and mathematics are just integrated (Roberts & Cantu, 2012). Children at the age of 11 leave primary education and start their transition to secondary education. In this phase, these adolescents' transition to the thinking level (Piaget, 1965). Minderovic (2006) explains that the universal nature of humans is to follow inferences and to think logically, which is the foundation of the thinking level. Since STEM is problem-based learning, it needs logical thinking and in-depth analysis (Kelley & Knowles, 2016). Engaging students in their early junior high school years to do experiments to solve problems in the learning phase can help them to think logically (King et al., 1998).

According to Penano-Ho (2004), the most effective teaching strategies for complex subjects such as science and mathematics are cooperative learning, hands-on experience, and self-discovery. These strategies help students to share even better understanding and knowledge, achieve their fullest learning capacity, and enhance their learning capability, respectively. In the Philippines, it was found that hands-on activities to introduce math topics and elicit discussion within and among students to activate meaningful learning help a lot (Penano-Ho, 2004). This is even better as compared to math classes that usually employ regular discussion that starts by giving rules and definitions of math concepts. Working in small groups, on the other hand, allows students to ask questions about math concepts for them to reason out logically, get some help, and communicate their knowledge well. As stated by Dr. Josette Biyo, DOST-SEI director, learning the basics of STEM prior to the secondary level is essential as it serves as the foundation for processing more complex concepts in later years of education. To make sure that students will still receive the utmost learning alongside the current pandemic, DOST-SEI develops supplemental resources that enable students to enrich STEM learning for the purpose of encouraging students to consider STEM careers in the future. The DOST-SEI, in collaboration with the DepEd, enhances STEM learning in the light of "RadyoEskwela sa Siyensa" and "TuklaSiyensya sa Eskwela" programs for elementary and secondary students, respectively (Bulaon-Ducusin, 2020).

METHODOLOGY

The study employed a cross-sectional survey design adhering to the parameters established (Klagge, 2018). The survey method is used to collect information from a set of individuals by asking them to answer certain questions about a specific topic and extending the findings to a larger population

(Check & Schutt, 2012). According to Lavrakas (2008), a cross-sectional survey gathers information in order to draw conclusions concerning a specific population of interest all at the same time. Survey design is quantitative in nature since its purpose is to accumulate numerical data to explain phenomena (Atlan, 2018). Specifically, the study implemented a descriptive quantitative approach and a correlational approach. According to Bas (2008), as stated in (Gürbüz, 2017), descriptive statistics are useful in describing the rate, average, and variability of the data.

As of September 13, 2021, there are 27,206 grade 7 to 10 students enrolled in the public schools of a certain city in the Philippines, of which 6 307 are grade 7 students, 6 779 are grade 8 students, and 7 261 are grade 9 students, and 6 859 are grade 10 students. Thus, following a 95% confidence level at least 382 random samples (n=382) have been considered in the study. The final count of respondents for the survey reached 430. Stratified random sampling was used to determine the participants for each of the schools and the grade levels. With this, the stratified random sampling allowed the researcher to represent each stratum best (Hayes, 2021; Kaplan, 2014).

The revised survey tool was adapted from Halim et al. (2018). The computed Cronbach's alpha value for this tool ranges between 0.817 and 0.933; therefore, it is evident that all the items in the tool have high reliability (Halim et al., 2018; Mohtar et al., 2019). The survey instrument is divided into five sections, wherein each section is focused on a specific construct. The instrument gathered information about students' demographic profile, environmental factors that contribute to STEM interests, STEM learning self-efficacy, perception of STEM careers, and interest in STEM careers. Table 1 shows the number of items for each construct. However, the International Standard Classification of Occupations (ISCO) by the International Labour Organization (n.d.) and monthly income by Albert (2018) used in Doce et al. (2020) were utilized in gathering more specific responses from the students about their profiles.

Table 1. Number of Items in the Survey Tool

Construct	Sub-construct	Number of items
Demographic Profile		7
Environmental Factors	Activities in the Classroom	4
	Activities Outside the Classroom	8
	Social Influence	11
	Media Influence	10
Self-Efficacy	Science	5
	Technology	5
	Engineering	5
	Mathematics	5
Perception of STEM Careers		14
Interest in STEM Careers		12
Total Items		86

Initially, the internal consistency of the survey questions was inspected in the light of Cronbach's alpha through the Small Stata version 13 (Stata 13) Software. Generally, the items under environmental factors are very reliable (a = 0.9535). From the environmental factors, activities outside the classroom (a = 0.9042), social influence (a = 0.8775), and media influence (a = 0.9536) are all very reliable, but only the questions about the activities in the classroom (a = 0.7447) are the sole exactly reliable. Likewise, the items about STEM self-learning efficacy (a = 0.9338) are all highly reliable. The alpha values of the items about science, technology, engineering, and mathematics are 0.9170, 0.8940, 0.8498, and 0.9184, respectively. Lastly, both the perception of STEM careers (a = 0.9544) and interest in STEM areas (a = 0.9497) are also very reliable. These claims are coherent with the rule of thumb of Nunnally (1978), that 0.70 and above are acceptable alpha values.

Table 2. Cronbach's Alpha Results of the Survey Questions

Construct	Element	Cronbach's Alpha Value
Environmental Factors		0.9535
	Activities in the Classroom	0.7447
	Activities outside the Classroom	0.9042
	Social Influence	0.8775
	Media Influence	0.9536

STEM Self-Learning Efficacy		0.9338
	Science	0.9170
	Technology	0.8940
	Engineering	0.8498
	Mathematics	0.9184
Perception of STEM Careers		0.9544
Interest in STEM Careers		0.9497

Small Stata, version 13 (Stata 13), was used to treat the data in the study. Frequency, mean, and standard deviation were taken to analyze the data. Specifically, frequency was utilized in determining the percentage of responses of students to the questionnaire. The mean was used to assess the general response of the students to each construct. The standard deviation, on the other hand, was used to describe the variability of responses.

The scale in Table 3 was used in interpreting the mean responses of the students in every construct.

Table 3. Interpretation of Total Score Mean (Nunnally, 1997)

Total Score Mean	Interpretation of Total Score Mean
1.00-2.50	Low
2.51-5.00	Medium Low
5.01-7.50	Medium High
7.51-10.00	High

Furthermore, tests of differences such as the Mann-Whitney U and Kruskal-Wallis Test were conducted to investigate underlying distinctions in the responses in terms of gender, grade level, and mode of learning, respectively. Likewise, correlational analyses were performed to traverse associations between the constructs – environmental factors, STEM self-learning efficacy, perception of STEM careers, and interest in STEM careers. The Spearman correlation coefficient, rho, was utilized to describe the correlation of the constructs.

FINDINGS

Influence of Environmental Factors

It is evident from Table 4 that all environmental factors are significantly associated with students' interest in STEM careers based on the probability values ($p > 0.05$). From among the environmental factors, activities in the classroom have the least correlation (rho = 0.2992) with STEM interest. Thus, activities in the classroom have a weak association with students' interest in STEM careers. This disproves the claim of Halim et al. (2021), where it was revealed that activities inside the classroom do not affect STEM self-efficacy and interest in STEM careers. Since students are in remote learning in the present academic year, they were expected to go back to their classroom experiences prior to lockdowns while answering the survey. For instance, since science laboratories and equipment are not available at home, students may consider their laboratory experiences in the most recent academic year they took physical classes. However, students' science experiments cannot be undermined during online classes. Since there are experiments that can be done at home, these experiences are also essential because their involvement also contributes to students' learning. Therefore, activities in the classroom may indeed affect interest in STEM careers. However, because of its weak association, the support of other environmental factors is necessary to substantially improve the students' interest in STEM careers that is why learning should be extended outside the classroom. In the Philippines, there are STEM related museums and science centers that are available to students, such as the Mind Museum, Philippine Science Centrum, National Planetarium, Manila Ocean Park, and Robotic Centers. Prior to the pandemic, some schools scheduled educational trips for students to witness research centers in different factories and even schools. In addition, to nurture students' outside learning experiences, some schools in the Philippines organize STEM camps and carnivals in such a way that they incorporate math and science into hands-on activities and games. Media influence, on the other hand, has the greatest correlation with students' interest in STEM careers. The correlation coefficient (rho = 0.5643) shows that a strong relationship exists between the media influence and students' interest in STEM careers. These findings support the claim of Suwarma et al. (2019). The study revealed that students who are taught about STEM fields through media and technology become eager to learn more in other STEM-based learning activities. Activities outside the classroom (rho = 0.4235) and social influence (rho = 0.4534) have likewise a strong relationship with students' interest in STEM careers. Generally, all these further indicate that external factors have a greater influence on the interest in STEM careers than the activities inside the classroom. Informal learning settings intensify students' interest in STEM careers (Mohr-Schroeder et al., 2014).

Table 4. Spearman's rho Correlation of Environmental Factors and Interest in STEM Careers

Variable	Interest in STEM Careers		
	Observation	Spearman's rho	Prob > t
Environmental factors	430	0.5589	0.0000
Activities in the classroom	430	0.2992	0.0000
Activities outside the classroom	430	0.4235	0.0000
Social influence	430	0.4534	0.0000
Media influence	430	0.5643	0.0000

STEM Self-Learning Efficacy of Students

Science Self-Learning Efficacy

Students find science learning challenging throughout the years, yet, based on the responses of the students about their science self-efficacy (see Table 5), a lot of them believe that they can obtain good grades in science subjects (M = 7.00, SD = 2.45). However, students neutrally agreed that they are able to write laboratory reports precisely (M = 5.07, SD = 2.64). In general, students have medium-high self-learning efficacy in science subjects. As a result, students perceive science with allied practices to be difficult because they have difficulty connecting science subject matter to their daily lives (Tan et al., 2022).

Table 5. Science Self-Learning Efficacy of students

Science	Mean Response	Standard Deviation	Response Interpretation
I can obtain good grades in science subjects.	7.00	2.45	Medium High
I can solve problems related to science concepts well.	6.42	2.51	Medium High
I can write laboratory reports (experimental reports) correctly.	5.07	2.64	Medium High
I can collect information on scientific concepts properly.	5.45	2.61	Medium High
I am sure that I can carry out scientific experiments in the laboratory properly.	5.43	2.71	Medium High
Over-all Science self-learning efficacy	5.87	2.68	Medium High

Technology Self-Learning Efficacy

With the implementation of distance learning, it is not surprising that students are comfortable using technology. The mean response of students to self-learning efficacy in terms of technology is promising. It is evident that students highly agreed (M = 8.62, SD = 2.25) that they could handle digital devices accurately. Meanwhile, students also highly agreed that they can use social media platforms properly, such as Facebook, Instagram, and Twitter (M = 8.34, SD = 2.01). Even though students are technologically advanced, their response to the proper use of computers is significantly lower compared to the other facets of media and technology as seen in Table 6. Still, as claimed by Desoete (2009), the use of technology is beneficial to enhance students' learning who are traditionally challenged with mathematics, learners whose prior knowledge of mathematics is limited, and learners with disabilities.

Table 6. Technology Self-Learning Efficacy of students

Technology	Mean Response	Standard Deviation	Response Interpretation
I can download an image or video from the Internet.	8.37	2.33	High
I can handle everyday technological products easily (e.g., blender, microwave, toaster, rice cooker).	7.82	2.66	High

I can use the computer properly.	7.64	2.60	High
I can handle digital devices properly (e.g., smartphone, iPad, tablet).	8.62	2.25	High
I can use social media properly (Facebook, Instagram, Twitter).	8.34	2.01	High
Over-all Technology self-learning efficacy	8.26	2.42	High

Engineering Self-Learning Efficacy

Table 7 shows students' self-learning efficacy in terms of engineering. Looking at the mean responses, it can be inferred that students have low confidence in using welding tools properly (M = 4.82, SD = 2.94) and building electronic circuits (M = 4.53, SD = 2.78). Students somehow agreed that they could repair a broken toy (M = 6.38, SD = 2.81) and they could build a robot from Lego (M = 6.32, SD = 3.03). In the Philippines, there are limited opportunities for students to experience engineering activities. Only schools which specialize in skilled trades are offering courses in welding, drafting, electronics, and civil construction. On the other hand, most teachers develop students' engineering thinking indirectly. By exposing students to relevant engineering problem solving (such as math and physics), giving hands-on tasks to students (electrical circuit and drafting work), and exposing them to engineering-relevant video materials, students are somehow engaged in engineering. Yet, since students are forced to do distance learning at present, hands-on activities become more limited. These findings reveal that students' first-hand knowledge of engineering should be enriched to gradually attract more students in the STEM strand. As confirmed by Ayar (2015), students' first-hand experience in robotics significantly sustains STEM interest and greatly contributes to their understanding of engineering in general.

Table 7. Engineering Self-Learning Efficacy of students

Engineering	Mean Response	Standard Deviation	Response Interpretation
I am sure that I can build a robot from Lego.	6.32	3.03	Medium High
I can use welding tools properly.	4.82	2.94	Medium Low
I can assemble furniture.	5.90	2.95	Medium High
I can build electronic circuits.	4.53	2.78	Medium Low
I can repair a broken toy.	6.38	2.81	Medium High
Over-all Engineering self-learning efficacy	5.59	3.00	Medium High

Mathematics Self-Learning Efficacy

Table 8 presents students' mathematics self-learning efficacy. It can be seen that students' responses range from 5.87 to 6.60, which can be interpreted as moderately high. Considering that mathematics is one of the subjects that is most feared by many, students still responded that they are somehow positive that they can obtain decent grades in mathematics subjects (M = 6.60, SD = 2.63). However, it is alarming that students said that they are not that competent in using scientific calculators (M = 5.87, SD = 2.72) considering that they are confident in using technologies. As stated in the study by Heller et al. (2005), students who have access to calculators in the instruction phase significantly perform better compared to those who do not have access to calculators. Likewise, mathematics self-efficacy is essential for choosing a major, whether students pursue STEM or non-STEM careers (Lin et al., 2018).

Table 8. Mathematics Self-Learning Efficacy of students

Mathematics	Mean Response	Standard Deviation	Response Interpretation
I can obtain good grades in mathematics subjects.	6.60	2.63	Medium High
I am confident that I can record data accurately.	5.90	2.65	Medium High
I can draw a graph from the provided data.	6.04	2.71	Medium High
I am competent in using scientific calculators.	5.87	2.72	Medium High
I can solve mathematical problems properly.	6.23	2.60	Medium High
Over-all Math self-learning efficacy	6.13	2.68	Medium High

Perception of Students towards STEM Careers

The following table illustrates students' discernment towards STEM careers. It can be concluded that students highly agree that working in STEM fields entails creative problem-solving skills (M = 7.51, SD = 2.52) and that workers in STEM fields are required to work as a team (M = 7.75, SD = 2.50). To most students in STEM, problem solving appears distant because of its abstract nature (Tan et al., 2022). Thus, in addressing students' difficulty, STEM classes take advantage of the power of collaboration and teamwork to fill in gaps and work successfully (Jolly, 2015). Likewise, students moderately agree that working in STEM requires higher-order thinking, STEM jobs involve designing and repairing goods, and workers in STEM fields can help the lives of others. Yet, students just somehow agree that working in STEM-related fields gives satisfaction (M = 6.04, SD = 2.68). This figure is far from the claim of Paul (2018) that 81% of the 900 STEM employees in different fields said that they actually have a high job satisfaction rate. With the initial perception of students towards STEM careers in terms of satisfaction, the number of students going to the STEM strand is continuously insufficient.

Table 9. Perceptions of Students toward STEM Careers

Perception	Mean Response	Standard Deviation	Response Interpretation
The condition of STEM related workplace is safe.	6.57	2.53	Medium High
I get satisfaction if I work in STEM related fields.	6.04	2.68	Medium High
Careers in STEM fields are prestigious.	6.34	2.72	Medium High
The income of workers in STEM fields is high.	6.68	2.58	Medium High
Those in STEM fields can get jobs easily.	6.43	2.59	Medium High
STEM fields can provide greater career opportunities.	6.83	2.64	Medium High
Workers in STEM fields have enough time with their families.	5.67	2.53	Medium High
Workers in STEM fields can help the lives of others.	7.07	2.59	Medium High
Working in STEM fields require higher- order thinking skills.	7.30	2.58	Medium High
Jobs in STEM fields require construction skills.	6.90	2.58	Medium High
Jobs in STEM fields involve repairing goods/products.	7.11	2.48	Medium High
Jobs in STEM fields involve designing goods/products.	7.11	2.47	Medium High
Working in STEM fields require creative problem-solving skills.	7.51	2.52	High
Workers in STEM fields are required to work as a team.	7.75	2.50	High
Over-all perception towards STEM careers	6.81	2.63	Medium High

Interest of Students towards Different STEM Areas

Table 10 presents the interests of students in different STEM areas. The range of students' responses is 5.44-6.38, which is interpreted as moderately interested. The interest of the majority of respondents (M = 6.38, SD = 2.86) is promising in the field of computer science. As stated by Rothwell (2014), in the US, there are 40,000 computer science degree graduates annually, yet the number of job vacancies is roughly 4 million per year. Consequently, from among the STEM areas, chemistry garnered students' least interest (M = 5.44, SD = 2.92). Students' concerns in learning chemistry are the inadequate laboratory materials, inappropriate teaching methods of the teachers, and truncated awareness of career opportunities the subject provides (Woldeamanuel et al., 2013). On the other hand, students' interest in the field of engineering offers great opportunities to students (M = 5.87, SD = 2.99). Approximately, in the US, 200,000 slots in the field of engineering are unfilled every year for the reason that only 60,000 graduate from this area annually (Machi, 2009).

Table 10. Interest of Students towards Different STEM Areas

Interest	Mean Response	Standard Deviation	Response Interpretation
Physics: *Aviation engineer, alternative energy technician, lab technician, physicist, astronomer.*	5.68	2.93	Medium High
Environmental Works: *Pollution control analyst,*	5.78	2.80	Medium High

environmental engineer or scientist, erosion control specialist, energy systems engineer and maintenance technician.			
Biology and Zoology: *Biological technician, biological scientist, plant breeder, crop lab technician, animal scientist, geneticist, zoologist.*	5.78	2.82	Medium High
Mathematics: *Accountant, applied mathematician, economist, financial analyst, mathematician, statistician, market researcher, stock market analyst.*	5.90	2.88	Medium High
EarthScience: *Geologist, weather forecaster, archaeologist, geoscientist.*	5.88	2.96	Medium High
Computer Science: *Computer support specialist, computer programmer, computer and network technician, gaming designer, computer software engineer, information technology specialist.*	6.38	2.86	Medium High
Medical Science: *Clinical laboratory technologist, medical scientist, biomedical engineer, epidemiologist, pharmacologist.*	6.01	2.97	Medium High
Chemistry: *Chemical technician, chemist, chemical engineer.*	5.44	2.92	Medium High
Energy: *Electrician, electrical engineer, heating, ventilation, and air conditioning technician, nuclear engineer, systems engineer, alternative energy systems installer or technician.*	5.56	2.96	Medium High
Engineering: *Civil, industrial, agricultural, or mechanical engineers, welder, auto-mechanic, engineering technician, construction manager.*	5.87	2.99	Medium High
Entrepreneur or business scientists: *Designing STEM-related products through innovation.*	6.05	2.77	Medium High
Science Teachers/Educators: *Educators who teach STEM and its applications at schools and universities.*	5.86	2.96	Medium High
Over-all interest towards different STEM areas	5.85	2.91	Medium High

Comparison of Students' STEM Self-Efficacy, Perception of STEM Careers, and Interest towards Different STEM Areas

The Mann-Whitney U test and Kruskal-Wallis Test were used to compare the responses of males and females and students in different grade levels and learning modalities towards different constructs. Since the data is not normally distributed, non-parametric tests were employed.

Comparison of Males and Females in Terms of Environmental Factors, STEM Self-Efficacy, Perception of STEM Careers, and Interest towards STEM areas

A series of Mann-Whitney U tests were run to determine if there was a significant difference in terms of the variables between males and females. There are no significant differences between males and females in environmental factors ($p = 0.6642$), STEM self-learning efficacy ($p = 0.3732$), perception of STEM careers ($p = 0.0526$), and interest in different STEM areas ($p = 0.1380$). Thus, gender does not provide disparities in students' STEM experiences, perceptions, and interests. Yet, it is notable that the mean response to environmental factors is medium-low. This supports the study of Halim et al. (2021), which revealed that environmental factors such as family influence, classroom experiences, and out-of-school time learning experiences significantly contribute to students' STEM career interests. Therefore, this factor should be strengthened to attract more students in the field of STEM. In addition, looking at Table 11 closely, females' perception of STEM careers ($M = 6.94$) is higher than that of males ($M = 6.58$). On the other hand, males' interest in STEM careers ($M = 6.02$) is higher than that of females ($M = 5.74$).

Table 11. Mann-Whitney U Test of All Variables by Gender

Variable	Prob > z	Mean	
		Male	Female
Environmental factors	0.6642	4.79	4.83
STEM self-learning efficacy	0.3732	6.55	6.41
Perception of STEM careers	0.0526	6.58	6.94
Interest in STEM areas	0.1380	6.02	5.74

Comparison of Different Grade Levels in Terms of Environmental Factors, STEM Self-Efficacy, Perception of STEM Careers, and Interest towards STEM areas

Kruskal-Wallis Tests were run to assess if there were significant differences in terms of the variables across different grade levels. Of the four variables, only the perception of STEM careers significantly differs across the grade levels (p = 0.0001). In addition, as students get older, their perception of STEM careers increases. Also, the downfall from students' perception of STEM careers to their interest in STEM areas is noticeable. This greatly supports the claim of Gerlach (2021), 60% of female students in high school alone who were initially interested in STEM during their freshman year are no longer interested upon graduation from high school because of the fact that 35% of them feel that they do not get enough support in the field.

Table 12. Kruskal-Wallis Test of All Variable by Grade Level

Variable	Prob > z	Mean			
		Grade 7	Grade 8	Grade 9	Grade 10
Environmental factors	0.5021	4.87	4.55	4.93	4.90
STEM Self-efficacy	0.0566	6.12	6.41	6.54	6.82
Perception of STEM careers	0.0001	6.26	6.45	7.19	7.31
Interest in STEM careers	0.8574	5.88	5.97	5.81	5.74

Comparison of Students from Different Learning Modality in Terms of Environmental Factors, STEM Self-Efficacy, Perception of STEM Careers, and Interest towards STEM areas

Table 13 shows the Kruskal-Wallis results for all the variables in terms of learning modality. From the table, it is evident that the responses of the students to all variables except the students' interest in STEM careers significantly differ depending on the learning modality that they are enrolled in. In terms of environmental factors (p = 0.0188), the responses of the students from the pure modular approach (M = 4.50) are significantly lower. Thus, students from this learning modality need support in order for them to afford the blended or pure modular approach. The STEM self-learning efficacy (p = 0.0001) of the students is also significantly different. Students from the blended approach (M = 6.76) showed the greatest mean, while students from the pure modular approach (M = 5.89) had the lowest self-efficacy. In addition, students' perception of STEM careers (p = 0.0005) is also statistically different across different learning modalities. Even though the perception of students towards STEM careers is relatively high, students from pure modular approaches registered the least perception (M = 6.22). Considering that the students do not significantly vary in terms of their interest in STEM careers, the responses coming from the pure modular approach are extremely alarming. This strongly suggests that the pure modular approach contributed significantly to students' lack of interest in STEM careers.

Table 13. Kruskal-Wallis Test of All Variable by Learning Modality

Variable	Prob > z	Mean		
		Blended	Modular	Online
Environmental factors	0.0188	4.97	4.50	4.70
STEM Self-efficacy	0.0001	6.76	5.89	6.10
Perception of STEM careers	0.0005	7.10	6.22	6.53
Interest in STEM careers	0.9086	5.89	5.73	5.91

Relationship of Students' STEM Self-Efficacy, Perception of STEM Careers, and Interest towards Different STEM Areas

Table 14 summarizes the correlation of the constructs towards one another. This table shows that all constructs are positively and significantly correlated. In addition, environmental factors (rho = 0.5589), STEM self-learning efficacy (rho = 0.5014), and perception of STEM careers (rho = 0.4053) are strongly linked to students' interest in STEM careers. This is aligned with the study of Bahar and Adiguzel (2016). STEM self-efficacy, environmental factors, and self-motivation immensely contribute to students' STEM career curiosity. However, students' strong perception of STEM careers is not enough for them to develop a great interest in different STEM careers. It is also important to stress that self-efficacy and perception of STEM careers have the highest correlation rate (rho = 0.6760). This proves the claim of Blotnicky et al. (2018) that students with high mathematics self-efficacy, and those who have a huge interest in scientific and technical skills are more likely to push through STEM careers. Since environmental factors and STEM self-efficacy have a strong relationship (rho = 0.6423), and environmental factors are also significantly correlated to interest in STEM careers (rho = 0.5589), students' inside and outside school learning experiences in terms of STEM should be enriched. As stated by Halim et al. (2021), both interest in STEM careers and students' STEM self-learning efficacy are boosted through exposing students to STEM events outside and inside of school. Thus, STEM careers should appear relevant to students to enhance their interest in both the STEM strand and careers.

Table 14. Spearman's rho Correlation of the Different Variables

Variables	Environmental Factors	STEM Self-Efficacy	Perception of STEM Careers	Interest in STEM Careers
Environmental Factors	1			
STEM Self-Efficacy	0.6423*	1		
Perception of STEM Careers	0.5349*	0.6760*	1	
Interest in STEM Careers	0.5589*	0.5014*	0.4053*	1

**statistically significant*

CONCLUSIONS AND RECOMMENDATIONS

The current status of the country in terms of producing and having sufficient STEM professionals poses a serious problem to its curriculum developers. The need to strengthen STEM delivery in the country is undeniably long overdue as continuous programs, implementations, and even scholarships are almost always available to both teachers and students. Aside from the DOST scholarship that aims to empower students to finish their STEM college courses, the Gokongwei Brothers Foundation, in partnership with the DepEd, provides scholarships to college and master's degree (public school teachers) students who are inclined towards STEM (Villegas, 2022). The goal of the scholarship is to provide an avenue, especially to public school educators, to better serve and inspire their learners as well as the community through intensifying their knowledge of STEM areas.

With the students' low self-efficacy towards key STEM areas, the country is still far from achieving its goal of producing enough professionals who are 21st century literate. Thus, improving students' self-efficacy should be given more focus to encourage them to deal with challenging real-life applications of their learning. Students should look at studying as an opportunity to learn, not an obligation to finish. This behavior will greatly influence students' ability to learn substantially. Changes in behavior are influenced by the strength of self-efficacy. Those who have a higher level of self-efficacy are more likely to be successful because of their persistence in obtaining accomplishment, regardless of the difficulty level, since they see these tasks merely as challenges to be overcome (Albert Bandura, 2010; Tuan et al., 2011).

The results of the present study reveal that due to environmental factors in and outside the classroom, the STEM learning experiences of the students are insufficient in developing their interest in STEM careers. Having said this, students lack personal experience in solving real-life problems related to science. Considering the STEM self-learning efficacy of students, the use of technology in introducing and attracting students to STEM may be considered with proper guidance. Students' knowledge of using different social media platforms should benefit them in the sense that STEM knowledge is made available on these platforms. Students' self-efficacy and perception of STEM careers are significantly and positively correlated to their interest in STEM careers. With sufficient support and guidance, students' interests in STEM careers will eventually develop and continue their careers in the field even after schooling.

Retooling the curriculum in the junior high school is also important to give space to more important skills that need to be developed, such as the students' critical thinking, problem-solving skills, knowledge of robotics, carrying out mathematical data, and laboratory skills. Allocation of a greater budget should be considered in DepEd to address the growing needs of students, especially in public schools, since the majority of the students are coming from low-income households. Thus, opportunities should be equally available to public schools, across sections, not just the homogenous schools and classes. Revisiting the techniques and styles of the STEM teachers needs to be done as well to properly determine and address their needs in dealing with the students in junior high school. Helping teachers identify and comprehend trends in STEM teaching and learning will benefit students. In this sense, educators can identify what is lacking in their schools and practices. Local government officials can also help intensify students' interest in STEM fields by providing help with necessary materials and gadgets. Having STEM-useful gadgets and materials that are available within the area of the students will minimize students' reasons for not embracing STEM interest.

Because of the current pandemic, since the study was conducted through an online survey, students who do not have access to technology and the internet were unable to participate in the study. Having said that, the study may not provide enough information to students from low socio-economic profiles. This problem of participant bias may be addressed by future research by preparing printed survey materials. Since the data was gathered solely through the questionnaire, the dependability of the students' responses is also in question. Thus, longitudinal studies may be considered by future researchers in this field to strengthen the findings of the study. Data triangulation through interviews and face-to-face observation could also address the loopholes in the research findings.

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