

EXPLORING THE GRASSROOTS: PREDICTORS FOR CHOOSING THE IN- HOUSE MEDICAL TECHNOLOGY PROGRAM AMONG THE STUDENTS OF SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS STRAND AT EMILIO AGUINALDO COLLEGE – CAVITE

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Abstract *Learning is synonymous to experience. This platform suggests to ever-changing need of an individual, given that it is in the academe or in any realistic environment. One big step to learning what is supposed to grasp by someone is to enroll his/herself in the most suitable course possible. In the highest hopes to give the fullest to the students of the Philippines, the Department of Education established a new curriculum which was based from the rest of the countries which follow K to 12 curricula. This research deals with the lived experiences of selected STEM students toward their endeavor to take Medical Technology in college. The lived experiences of Home-grown STEM students were analyzed and purposefully validated using the Qualitative method specifically Interpretative Phenomenological Analysis as the design. Interview questions were presented to construct semi structured questions. Furthermore, theories and other concepts were provided to support the ideas related to modalities in taking Medical Technology. The said course is the most productive and acknowledged one amongst other courses found in Emilio Aguinaldo College – Cavite. As the backwash of this study, the superordinate themes that served as the main answers to its general research questions are intrested, determined and goal Setter*

Keywords *Grassroots, Preference, Semi-structured*

INTRODUCTION

A college degree is the key to realizing the dream, worth the sacrifice because it is supposed to open the door to a world of opportunity. (Rather, N.D.)

According to Ospina and Roser (2018), tertiary education is distinct from other forms of education. Studying in college is the game changer towards the life of an individual. Universities were established organizations free from the control of the church or other religious institutions (Roser, 2018). In the modern world, universities have two purposes: equip students with advanced skills useful in the workplace and to further human knowledge and understanding of the world (Ospina, 2018).

In the light of this topic, the researchers see this as a platform of knowing first the preferred course/s of an individual for him/her to make an impact to the society. Therefore, the researchers want to reach and study the phenomenon of choosing the right course in tertiary level. One of the reasons why the researchers want to focus more on this context is because the Department of Education had implemented since 2013 the New Curriculum which is known as K to 12 (Kindergarten to Grade 12). According to Secretary Briones (2016) “We teach them how to analyze, how to solve problems, how to respond to change and to accept change because by the time they graduate, whatever we have taught them, not all of them, will be applicable – because change is happening so fast. The development of the K to 12 curriculums has evolved into something specific and still evolving every single year. Based from the website of the Department of Education posted in 2017, There are four tracks to choose from, (1) Academic

Track, (2) Technical- Vocational-Livelihood Track, (3) Sports Track, and (4) Arts and Design Track. The researchers chose the academic track since the Institution of Emilio Aguinaldo College - Cavite only offers two given tracks, the Academic and Technical-Vocational-Livelihood. Under Academic track, the promotion of strands is seen. It has General Academic, Humanities and Social Sciences, Science, Technology, Engineering and Mathematics and Accountancy, Business and Management. The researchers are eager to give back to the institution with the simplest effort. This research only seeks to provide descriptions to a specific strand which is the Science, Technology, Engineering and Mathematics. STEM strand has the largest count among the given strand in EAC - Cavite and most of the freshmen students who enrolled this Academic Year came from STEM strand specifically, the pioneer batch of Senior High School in 2016 (A report from the Registrar's Office of the institution).

Numerous activities focus on integrated STEM learning experiences aimed at developing conceptual scientific and mathematical knowledge with opportunities for students to show and develop skills in working with each other and actively engaging in discussion, decision making and collaborative problem solving (Dawes, 2015). Since the researchers are very much aware that the School of Medical Technology successfully produces students with quality education, the researchers see it as the gap to this study.

The researchers observe the phenomenon of why Grade 12 students under STEM strand choose Medical Technology as their preferred course in college. And, this is a great promotion for the institution to grab the students' preferences to study here in EAC – Cavite.

REVIEW/SURVEY OF RELATED LITERATURE

This portion deals with the supporting literature and studies of the said research topic.

ACADEMIC COMMITMENT OF SENIOR HIGH SCHOOL

Different studies introduce that the prior academic commitment has an impact on the college outcome when it comes to enrolment. Engberg and Wolniak (2013) debated that among the strongest predictors of entering a STEM discipline was academic preparation, as measured by course-taking patterns, performance, and access to a coherent math and science curriculum. This statement of Engberg and Wolniak continues to make difference from the preference of the selected students from STEM strand. Academic preparation takes the alignment of ideas to gathering self –confidence of the aspiring medical technology students.

Furthermore, several studies have revealed the important role of mathematics and science in generating academic competency and enhancing success in college by taking the medical technology.

Students' academic orientation (i.e., their interests, identity, orientation toward, and plans for life after high school) is often shaped through school and non-school experiences. While noting that integrated STEM learning experiences can support interest and identity development, the Committee on Integrated STEM Education (2014, p. 3) argues that, to date, the research is limited by a lack of longitudinal analyses that account for the different phases of interest development.

DECISION EMPOWERING BY THE INSTITUTION

Senior High School for the students of Science, Technology, Engineering and Mathematics Strand takes a key role in both Science and Mathematics application. It is an achievement for the students to surpass the requirements set by the standards. Villanueva & Hand, (2011) stated that the decision depends from the institution's way of processing things for the students. STEM course- taking patterns for students with LDs is limited, the little work that has been conducted

is consistently grim. Whether attributable to having an LD, to the “LD” label itself (Shifrer, Callahan, & Muller, 2013).

From the journal of L. Allen Phelps, several studies have documented how post-secondary outcomes, including STEM major choice, vary by social and demographic groups. Looking only at four- year college attendees, Chen and Weko (2009) report that students choosing STEM college majors were pre-dominantly: male, Asian/Pacific Islander, foreign-born, members of families with annual incomes in the top quartile, younger, and not living independently. Roughly 13–22% of students entering four-year colleges after high school were choosing a STEM major from 1995 to 2004. Unfortunately, similar profiles of two-year college STEM entrants are not available, which points to the importance of this investigation. Examining a national sample of college freshmen, Moakler and Kim (2014) found female students throughout high school were less likely to develop outcome expectations toward a STEM major choice or career field. Other research has consistently shown that being a woman is a strong negative predictor for several STEM-related practices and factors; e.g., accessible college career options (Betz & Hackett, 1981), gatekeeping math courses (Chavez, 2001), year-long college course on career-linking strategies (Fouad, 1995), and STEM teaching and advising. Completing engineering and engineering technology (E&ET) courses in high school has the potential to advance these two goals. Two major national initiatives have advanced the inclusion of E&ET instruction in high schools. Twenty- six states have collaborated to develop the Next Generation Science Standards (NGSS), which were released in 2013. These standards elevate the importance of engineering design and make it comparable to learning the core ideas in the physical, life, and earth and space sciences (National Academies of Sciences, Engineering, and Medicine, 2017; Next Generation Science Standards, 2016). Equally important, in 2014 the National Assessment of Educational Progress introduced the Technology and Engineering Literacy assessment, designed to measure the extent to which 4th, 8th, and 12th grade students were able to apply technology and engineering skills to real-life situations (National Assessment Governing Board, 2014). Collectively, these initiatives assert that E&ET content and skills are potentially scalable and measurable across high schools within states. Research reviews indicate that high school course-taking has an impact on students’ decisions to enroll in college (Adelman, 2006; Hein, Smerdon, & Samboldt, 2013). Over the past decade several studies have examined the influence of high school math and science course completion on the choice of STEM college majors—an outcome deemed critical for achieving several national STEM work force development priorities (PCAST, 2012; U.S. Chamber of Commerce, 2017). Several studies have documented the key influence of math and science courses (Engberg&Wolniak, 2013; Gaertner, Kim, DesJardins, & McClarty, 2014; Trusty, 2002; Tyson, Lee, Borman, & Hanson, 2007; Wang, 2013) on choosing STEM majors, particularly in four-year colleges. More recently, applied STEM courses have shown a positive link to later advanced math and science course completion (Gottfried, 2015), which may also contribute, albeit indirectly, to students choosing a STEM college major pathway.

Furthermore, from the journal of the role and influence of engineering instruction have increased significantly in the past five years (Carr, Bennett, & Strobel, 2012; Community for Advancing Discovery Research in Education, 2017). While the research base on high school engineering programs is growing (Committee on Integrated STEM Education, 2014; Committee on K–12 Engineering Education, 2009; Community for Advancing Discovery Research in Education, 2017), the influence of E&ET course-taking on post-high school outcomes (e.g., college attendance, selection of STEM majors, credential completion, earnings, etc.) is under-examined in the research literature.

STATEMENT OF THE PROBLEM/OBJECTIVE OF THE STUDY

This study aims to establish and present a solution to the research gap, which is analyzing the modalities that might be the reason of additional enrollees of Medical Technology.

GENERAL QUESTIONS

1. What are the modalities concerning the preference of the in-house enrollees in taking Medical Technology in college?
2. How would these modalities influence their decision in pursuing Medical Technology?
3. How do SHS teachers assist the choices made by the STEM students?

SPECIFIC QUESTIONS

- 1.1 What are the typical aspects connecting to decision in enrolling Medical Technology at Emilio Aguinaldo College - Cavite?
- 1.2 What kind of preparation do the students engage in as an indicator of their choice?
- 2.1 How do students react in the concern regarding their course in college?
- 2.2 How do students embody their desired course in college?
- 3.1 How teachers significantly hone the interest of the students in taking their course in college?
- 3.2 What are the outcomes of honing the students' interest?

THEORETICAL FRAMEWORK

Holland's Theory of Career Choice

People search for environments where they can use their skills and abilities and express their values and attitudes. For example, Investigative types search for Investigative environments; Artistic types look for Artistic environments, and so forth. (Holland N.D.)

This theory brings explicit meaning to searching the environment which is a comfortable place for the people to expound their horizon in their chosen fields. Knowing the students are so much aware of the courses they may attend to in college while they are in the process of Senior High School, participant may considerations of taking bio-medical courses.

Course Selection Theory

A proposed adaptation of modern college choice models that can be used to explain how college students determine which courses to select. Student Choice Construct An empirically tested construct or theorization that students make sequences of choices in situated contexts and these choices are influenced by diverse backgrounds, family backgrounds, and environmental variables and that policy effects should be studied across these diverse contexts. The advantage of using the student choice construct is it allows for the study of diverse college students on their own terms while incorporating the students' own unique circumstances and experiences. The creation of this theoretical framework that includes sociological and cultural theories allows researchers to emphasize the important role played by social and cultural variables and how they influence students' choices (Horvat, 2001; McDonough, 1997; Paulsen, 1990; Paulsen & St. John, 1997, 2002; Perna, 2006; Perna & Titus, 2005; Salisbur et al. 2009; Salisbury et al., 2010).

Year Transition Program or Seminar

An extended orientation program or course offered during an academic term designed to assist students with the academic and social transitions to college.

Typical topics include study skills, time management, test taking strategies, motivation or goal

setting, health related topics (alcohol, tobacco, stress, test anxiety, relaxation), use of campus resources including the library, learning assistance centers and campus technology, career counseling or assistance with selecting a major, critical thinking, student life, sexuality and relationship issues, financial management, higher education and institution. Specific history, values, and culture, and the overall social integration into the larger campus community (Barefoot, 2004; Bolender, 1994; Coleman & Freedman, 1996; Engle et al., 2004; Gordon & Grites, 1984; Lipsky & Ender, 1990; Myers, 2003; Ness et al. 1989; Ryan & Glenn, 2004; Upcraft, Gardner, & Barefoot, 2005; Wilkie & Kuckuck, 1989)

SIGNIFICANCE OF THE STUDY

This section deals with the beneficiaries of the study.

SENIOR HIGH SCHOOL STUDENTS This helps the graduating students to choose their course in college most

Especially the STEM students.

SENIOR HIGH SCHOOL TEACHERS The study wants to enlighten teachers about the factors the students have to think of in pursuing Medical Technology in college.

SCHOOL OF MEDICAL TECHNOLOGY This research enlarges the horizon of the department to have enrollees to train as future medical technologist.

EMILIO AGUINALDO COLLEGE COMMUNITY The study advocates choosing the said school to the graduating batch of Senior High School and to expound the growing number of students in the institution.

DEFINITION OF TERMS

This area shows the conceptual and operational meanings from the manuscript.

- Modalities – the quality or state of being.
- Grassroots – Basic things to remember to decide.
- Community – a unified body of individuals; such as state or commonwealth.
- Institution – an established organization or corporation.

SCOPE AND LIMITATION

This part entails the boundaries of the research.

The research concerns itself with the modalities concerning to the preferences of the Senior High School Students in taking Medical Technology as their course in college. The participants of this study are the Grade 12 Students under Science, Technology, Engineering and Mathematics Strand who are taking their science related subjects namely General Chemistry, General Biology and General Physics. As for the locale of the study, the research and its process would be conducted on the School grounds of Emilio Aguinaldo College – Cavite. The data gathering tool, which is interview, will prove vital and efficient in the collection of data. The duration of the study is from September 2018 to August 2019.

METHODOLOGY

Study Design

This part discusses the research design used in the research.

This research maximized the use of Interpretative Phenomenological Analysis (IPA) under Qualitative method. This deals with the lived experiences and how the individuals give meaning to a certain situation. (Levinson, 1996)

Instrumentation

This section presents the tools to be used during the research process.

The purpose, procedures and risks will be thoroughly explained, and a written informed consent will be obtained from each of the participants under 18 years old. Upon consent, the interview questions will be given immediately to all the participants and all information will be kept anonymous and will be interpreted with confidentiality. Semi-structured interview questions are observed in the following sessions. There is no conflict of interest in this study. Moreover, the validity has checked and verified by the professional.

Sampling Technique

This part presents the number of participants in the study

This study will be carried out from the Selected Senior High School Students under Science, Technology, Engineering and Mathematics Strand at Emilio Aguinaldo College – Cavite using Purposive Sampling. According to Cristobal (2017), Purposive sampling involves handpicking subject, usually to suit very specific intentions. This is also called, Judgmental Sampling. The study will be conducted upon the approval of Ethics Committee of the Faculty of Biomedical Sciences at Emilio Aguinaldo College – Cavite.

Data Analysis

This part entails the treatment to be used in the research.

According to Cristobal (2017), Thematic Analysis is a process of analyzing the data by grouping them according to themes, either evolved directly from the research questions or preset, or naturally emerge from the resulting data. The researchers used thematic analysis to apply sub themes, themes, and super ordinate themes.

Data Gathering Procedure

This part details the procedure that the researchers conducted.

The researchers created interview questions and let those questions be validated by the professional. Afterwards, the participants were selected based on their same characteristics using purposive sampling.

Ethical Consideration

The researchers ensured the participant’s safety by keeping the confidentiality of their private practices or any other practices and must not be, disclosed to the public.

Opening up about experiences that are sensitive in nature can increase the level of anxiety –may cause distress during, and in some cases, after the interview. Thus, some ethical considerations were strictly observed.

The participants informed of the procedures, objectives, and aims of the study. In lieu of the sensitive nature of the study, strict confidentiality of the identity of the participants and other persons named during the interview will be enforced by going under a pseudonym. Ethics clearance was given by the Institutional Ethics Review Board (IERB) of the Emilio Aguinaldo College-Cavite.

RESULTS

Presentation of Data

This section explains the themes, statements, and sources of the phenomenon.

| IMPACTFUL | IN- VIVO STATEMENTS | SOURCES |
|-------------------------|---|--------------------|
| INFLUENCE OF THE FAMILY | <i>“For me, my mother was a nurse at the... saibangbansapo, yungkuyako, po is a student, second-year student, ah, nursing, then sabiko, I want to be a med tech”.</i> | Pg.11, Lines 3-5 |
| SELF-AWARENESS | <i>“I am studying po ah..yung anatomy, physics, as anopo background parapag nag college may alamnaagad”.</i> | Pg.11, Lines 8-9 |
| SYSTEMATIC | IN- VIVO STATEMENTS | SOURCES |
| DYNAMIC | <i>“napaka active kopokasiparangangdamikongnatutunan then, angdamiko pong naencouragena mag medtechnaibang students”.</i> | Pg.11, Lines 12-13 |
| PROCEDURAL | <i>“ahyungmga hygiene po,parang mas inaanokonadapatmaliniska, pagmagmemedtechkadibadapatmaliniska then</i> | Pg.11, Lines 17-20 |

*yungparanganoyung immune system
momataaskasiparahindikamahawadoonsamgainoobserbahanmo”.*

| INTERNAL MOTIVATION | IN- VIVO STATEMENTS | SOURCES |
|---------------------|--|--------------------|
| DRIVEN | <i>“magandadawyungmedtechkasi mas mataasyungkapitnyapag mag do doctor daw po akopara i-pursue talaga”.</i> | Pg.11, Lines 24-25 |
| READINESS | <i>“I am ready to be a medical student. The readiness is there”.</i> | Pg.11, Line 28 |

Table 1. Participant No. 1: Work

The summary table shown above was the interview of participant 1 a.k.a Work. There are three themes used in the table which are Impactful, Systematic, and Internal Motivation.

The first theme is **Impactful** in which the personalities of the participant were expressed as a person who achieves significant results under this theme, there are two sub themes, there are

Influence of the family and Self-awareness

The second theme is **Systematic**. This is where the participant grasped the essence of following procedure to be a medical student. Under this theme, there are two sub themes, **Dynamic** and

Procedural

The last theme is **Internal Motivation**. This is where the participant applied the possibilities of doing what it takes to become a medical technologist someday. Under this, there are two sub themes, **Driven** and **Readiness**.

| OBEDIENCE | IN- VIVO STATEMENTS | SOURCE |
|---------------------------|--|--------------------|
| EXPECTATION OF THE FAMILY | <i>“kasiyungparangnaging history ng family naming kasiparangayunpoyung expectations nilasa akin at sa course ko.”</i> | Pg.12, Lines 3-4 |
| ESSENTIAL | <i>“lalonapoyung general bio, parang mas pinupursuekopoyungsarilikosa subject nay un na mas ifocus pa poyungsarilikosa study nay un. Mas binibigyankopong time”.</i> | Pg.12, Lines 7-9 |
| GOAL ORIENTED | IN- VIVO STATEMENTS | SOURCE |
| INSPIRED | <i>“parang mas inspire poako.”</i> | Pg.12, Lines 12 |
| FASCINATED | <i>“ahmm, yungapo mas nafofocuskopoyunglalonayung science then, nafafascinatepoakosamgaturok.”</i> | Pg.12, Lines 17-18 |
| SKILLED | IN- VIVO STATEMENTS | SOURCE |
| PASSIONATE | <i>“maslaloko pong nagugustuhanang course na med tech. Sa taongnagbibigayng information tungkolsamedtech”.</i> | Pg.12, Lines 25-26 |
| KNOWLEDGEABLE | <i>“mas knowledgeable poakosa course naito at para din po mas mamasterkopo.”</i> | Pg.12, Line 29-30 |

Table 2. Participant No. 2: School

The summary table shown above was the interview of participant 2 a.k.a School. There are three themes used in the table which are Obedience, Goal oriented, and Skilled.

The first theme is **Obedience** in which the personalities of the participant were expressed as a person who follows order. Under this theme, there are two sub themes, there are **Expectation of the family** and **Essential**.

The second theme is **Goal Oriented**. This is where the participant got to focus only to one end goal that is to be a medical student. Under this theme, there are two sub themes, **Inspired** and **Fascinated**.

The last theme is **Skilled**. This is where the participant showed that they need to be equipped. Under this, there are two sub themes, **Passionate** and **Knowledgeable**.

| ENTHUSIASM | IN- VIVO STATEMENTS | SOURCE |
|------------|---------------------------|----------------|
| INTEREST | <i>“interest and ahm,</i> | Pg.13, Lines 4 |

| VISIONARY | IN- VIVO STATEMENTS | SOURCE |
|-------------|--|--------------------|
| INITIATIVE | <i>“research about things related to medical technology and minsanposa labs ako din poang nag mamananipulate.”</i> | Pg.13, Lines 7-8 |
| HOOKED | <i>“I feel interested po. Parang gusto ko pa pong magkaroonng deeper knowledge about that field. And see me as one of the professionals in that particular.”</i> | Pg.13, Lines 10-12 |
| DREAMER | <i>“as of now, I can really see myself po as a medical technologist and ahm, that was one of my childhood dreams.”</i> | Pg.13, Lines 15-16 |
| REALISTIC | IN- VIVO STATEMENTS | SOURCE |
| RELATABLE | <i>“ahm, siguroponarerateponilaang subject naming in real life”</i> | Pg.13, Lines 19-21 |
| SELF-GROWTH | <i>“mas mag iimprove pa yung character ko and yung mismong desire ko and mga knowledge ko about dun posa certain field nay un.”</i> | Pg.13, Line 24-25 |

Table 3. Participant No. 3: House

The summary table shown above was the interview of participant 3 a.k.a House. There are three themes used in the table which are **Enthusiasm, Visionary, and Realistic**.

The first theme is **Enthusiasm** in which the personalities of the participant were expressed as a person who does the job with a grateful and willing heart. Under this theme, there are two sub themes, there are **Interest** and **Initiative**.

The second theme is **Visionary**. This is where the participant desired to finish the race and expect for a great result. Under this theme, there are two sub themes, **Hooked** and **Dreamer**.

The last theme is **Realistic**. This is where the participant demonstrated that the end goal needs to be true. Under this, there are two sub themes, **Relatable** and **Self-growth**.

DISCUSSION AND SUMMARY OF FINDINGS

| THEMES | PARTICIPANT 1 | PARTICIPANT 2 | PARTICIPANT 3 |
|-------------|--|---|--|
| INTEREST | Pg.11, Lines 4 Pg.11, Lines 7-8 | Pg.12, Lines 3-4 Pg.12, Lines 7-9 | Pg.13, Lines 4 Pg.13, Lines 7-8 |
| DETERMINED | Pg.11, Lines 12-13 Pg.11, Lines 17-20 | Pg.12, Lines 12 Pg.12, Lines 17-18 | Pg.13, Lines 10-12 Pg.13, Lines 15-16 |
| GOAL SETTER | Pg.11, Lines 24-25 Pg.11, Line 28 | Pg.12, Lines 25-26 Pg.12, Line 29-30 | Pg.13, Lines 19-21 Pg.13, Line 24-25 |

Table 4. Superordinate Theme

This table showed the three superordinate themes that answer the general research questions such as Interest, Determined, and Goal Setter. As mentioned in the general research question no. 1 **What are the modalities concerning the preference of the in-house enrollees in taking Medical Technology in college?** Based on the answer of the participants, **INTEREST** appeared to be the most highlighted modality among the mentioned ones. In a research study the factor “match with interest” rated over job characteristics, major attributes, and psychological and social benefits in importance when students choose a major (Beggs et al., 2008). For general question no. 2, the researcher got a superordinate theme of DETERMINED to answer the question 2,

How would these modalities influence their decision in pursuing Medical Technology?

(Mihyeon, 2009) states that the confidence that a student has can determine how far a student will go with their education. Students who believe in themselves have more confidence and are more likely to go for what they want instead of settling for something that is comfortable. and as for the general research question no.3,

How do SHS teachers assist the choices made by the STEM students? As mentioned above, the answer for this question is that teachers of SHS department tend to teach the student on how to become a **GOAL SETTER**.(Wildman and Torres, 2002) state that teachers and coaches can help a student to do better in school, to get into college or to get on a better path. The impact that these adults have on young students can have a major influence on their career path.

CONCLUSION

This section closes the gaps of the research paper.

Based on the findings of this present research, the researchers were able to determine and identify the conclusions that answered the general research questions.

1. **INTEREST** appeared to be the most highlighted modality among the mentioned ones.
2. Interest can enhance their confidence to be **DETERMINED** in pursuing their desired course in college.
3. Teachers play a pivotal role in **SETTING THE GOAL** of the students as early as possible. And to make sure they are to conquer the correct path going to their success.

RECOMMENDATION

This part shares the future concerns for the following institution/unit:

Senior High School Students to prepare them for their future desired course not just in medical field but to other professions as well.

Senior High School Teachers to serve as the bridging personnel from the students' goal going to their success.

School of Medical Technology to consider the true to life experiences and preferences of the students in getting Medical Technology in college.

Emilio Aguinaldo College Community To boost the population of medical students inside the institution, people inside EAC-C should consider vivid analogy of human experiences.

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