

# COLLEGE OF MASS COMMUNICATION FOUNDATION, INC.

16 February 2022

DR. LEONOR MIRASOL MAGTOLIS- BRIONES

Secretary, Department of Education

DepEd Complex, Meralco Ave., Pasig, Metro Manila

SUBJECT: REQUEST FOR ENDORSEMENT

Dear Secretary Briones,

Warm Greetings from the U.P. College of Mass Communication Foundation, Inc. t We sincerely hope if letter finds you well and in good health. Time:

This year is the third and last year of the DOST - Science Education Institute (SEI) project "A Project on the Inclination and Decision of Filipino K11 to K12 Students in the Philippines to Pursue Science in College/University and us a Career Path (Year 3)", which the UP College of Mass Communication Foundation Inc. is conducting.

The results of the three-year research will be the basis for the development of a communication and media plan to promote science among Filipino students

We thank you for endorsing this project in the last two (2) years.

May we again request the endorsement of the Department of Education to encourage the participation of teachers and students in survey interviews, focus group discussions, and key informant inter was, all of which will be done online/remotely.

We will also appreciate your endorsement of this project to the regional offices of the Department of Education specifically, in the research sites, Regions I, III, V, VI, VII, VIII, IX, XI, XII, and NCR. The endorsements will greatly expedite our acquisition of informed consent and parental support for the participation of the schoolchildren and facilitate the conduct of our data gathering activities.

Attached to this request is the Year 2 Executive Summary and the Year 3 concept paper

Should you have any queries and concerns, you may get in touch with our UPCMCFI Assistant, Ms. Katrina Ramos at telephone number (±632) 8981-8500 local 2678 or email "UP College of Mass Communication Foundation, Inc. (UPCMCFI)" up conclude mail som

Thank you very much and we look forward to your favorable response.

Sincerely yours.

PROF. ARMINDAW, SANTIAGO, PhD

UP CMCFI President/Project Leader

CC.

Ally, NEPOMUCENO A. MALALUAN Undersecretary and Chief of Staff

ATTY REVSEE ACUNA ESCOBEDO Undersecretary
Planning, Field Operations, and Human Resources and Organizational Development (Organizational Effectiveness, School lifferiveness, and Human Resource Development)

TONISITO M. C. UMALL Esq. Undersecretary Legislative Affairs

To: All Schools Division Superintendents

Advisory

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For information.

ECLAR, PhD, CESO III Regional Director

DepEd · SDO of Bulacar

Republic of the Philippines Department of Education 4/5/2022

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For dissemination and compliance.

ZENIA G. MOSTOLES, EdD, CESO V **Schools Division Superintendent** 

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#### EXECUTIVE SUMMARY

Appreciating Science: A Project on Perception and Inclination of Filipino K7 to 10 Students in the Philippines to Pursue Science Tracks (YEAR 2)

This study is Year 2 of the three-year DOST-SEI and U.P. College of Mass Communication Foundation, Inc. (UPCMCFI) research project that explores the appreciation and relevance of Science among K3 to K12 students. Year 1 had K3 to K6 students as its focus and the major highlights are in the Executive Summary in Appendix A. This Year 2 phase covers K-7 to K-10 students.

The study sought to answer the question: "How and in what contexts will K7 to K10 students pursue a STEM or science-related track in their studies?"

Specifically, it aimed

- 1. To determine the interest and inclination of the students to take up science courses;
- 2. To identify the factors that will make the students engage in STEM subjects,
- To explore the push and pull factors that will encourage students to pursue or not pursue STEM tracks;
- To find out the role of science teachers in facilitating or hindering the effective teaching of science; and
- 5 To determine the situation of students amidst the COVID-19 pandemic and how they cope with the remote learning setup.

The survey areas were the National Capital Region (Quezon City, Marikina City and Makati City). Luzon (Region I, III, and V), Visayas (Region VI and VII), and Mindanao (Region VIII, IX, XI, and XII). Two schools from each region - one (1) public high school and one (1) private high school were selected.

Both quantitative method and qualitative data were obtained and triangulated. A structured questionnaire for the survey using Google form was pretested before it was finitized and administered through Zoom. Messenger, and mobile phone, while guide questions were constructed for the key informant interviews (KII) and Focus Group Discussions (FGDs). These too were pretested prior to data collection:

Frequency counts, cross-tabulations, t-test and logistic regression served as the bases for analyses and interpretations for the quantitative data. Cross-tabulations and t-test were used to examine differences between the variables gender, region and type of school (private or public) with respect to 1) interest/ inclination to take science courses, and 2) favorite strand/domain (top of 4 strands). Chi-square was used to measure the correlation between interest/inclination to take science courses and favorite strand/domain (top of four [4] strands). Logistic regression was used to determine the contribution of the nominated variables and demographic variables to a student's inclination to take science courses.

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knowledgeable about the subject and explain the lessons well. They like teachers who are creative, use visual aids and social media to enhance their teaching. Being able to approach their teachers for further explanation about the topic is a plus factor in learning about Science. Out of 1,067 students, 66.1% said they want to pursue the academic track in senior high school. Of these, close to two-thirds (444 or 63%) will select Science, Technology, Engineering, and Mathematics (STEM). The reasons given by the rest who do not want to pursue STEM are the STEM subjects are difficult/complicated, these are not related to the career they want to take, and they are not good in Math and computations. However, there are still students who are open to changing their decision to take STEM, provided that there will be a change in the course they want to take and it is STEM-related, there is a scholarship, incentive, or financial assistance offering for STEM, and/or their family/parents/guardians would advise them to take STEM. It is interesting to note that the top three (3) courses the students want to take in coffege are medicine, engineering and education/teaching.

According to the most number of students, the current COVID-19 situation has affected their studies and interest in Science, owing to the remote / online learning set-up, and that their modules are engaging enough to encourage them to study under the remote/online learning set-up.

The statistical tests indicate that there is a significant association between STEM intention and favorite science subject in NCR, where more students who like Force, Motion, and Energy intend to take up STEM (68%). A conducive learning environment ( $\exp(B) = 1.299$ , p = 0.005) and parents' support ( $\exp(B) = 1.514$ , p < 0.001) significantly raises the odds of a student intending to take up STEM. The variables included explain 22.4% of the variance in STEM intention. The model was able to correctly predict 67.0% of the cases. A conducive learning environment ( $\exp(B) = 1.299$ , p = 0.005) and parents' support ( $\exp(B) = 1.514$ , p < 0.001) significantly raises the odds of a student intending to take up STEM.

Living in Regions 6 (Exp(B) = 2.168, p = 0.012), 9 (Exp(B) = 3.073, p < 0.001), and 12 (Exp(B) = 2.122, p = 0.019) have significantly higher odds of STEM intention compared to living in NCR. 6. Living in Regions 3 (Exp(B) = 0.528, p = 0.038), 5 (Exp(B) = 0.382, p = 0.003), and 8 (Exp(B) = 0.184, p < 0.001) have significantly lower odds of STEM intention compared to living in NCR

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A Three-Year Project on the Perception of STEM Among Filipino Grades 3 to 12 Students in the Philippines (2020 to 2022)

Appreciating Science: "A Project on the Inclination and Decision of Filipino K11 to K12 Students in the Philippines to Pursue Science in College/University and as a Career Path (Year 3)

#### CONCEPT PAPER

PROGRAM TITLE	A Three-Year Project on the Perception of STEM Among Filipino Grades 3 to 12 Students in the Philippines (2020 to 2022)
PROJECT TITLE	Appreciating Science: A Project on the Inclination and Decision of Filipino K11 to K12 Students in the Philippines to Pursue Science in College/University and as a Career Path (Year 3)
PROJECT LEADERS	Professor Arminda V. Santiago, Ph.D./F and ProfessorLourdes M. Portus, Ph.D./F  Agency: UP College of Mass Communication Foundation, Inc.  Address/Telephone/Fax/Email: Ylanan St., Platidel Hall, College of Mass Communication, University of the Philippines, Diliman, Quezon City 1101 / 63-2-8981-8500 local 2661 and 2679 / 63-2-926-3465/ armisan2009@gmail.com/ avsantiago@up.edu.ph / Importus@up.edu.ph / up.emcfi@gmail.com
COOPERATING AGENCIES	None
SITES OF IMPLEMENTATION	10 Regions/Nationwide
PROJECT DURATION	March 2022 to February 2023

#### INTRODUCTION

STEM has become an important and salient component of basic education not only in the Philippines but throughout the world. Having its origin and nascence in the United States in 2001, this education policy, sometimes referred to as a curriculum choice, implicates the development of a knowledge-competitive workforce that can contribute to the economy of a country. STEM is an acronyin to mean Science- Technology-Engineering-Mathematics (sometimes shortened as Math); these are the identified fields or disciplines that weigh on the

perceived requirements to become an effective economic contributor. There are times when other disciplines are added into the mix, such as Arts and Medicine.

The emphasis on STEM is borne out of the belief that STEM generally serve to catalyze society's growth and development. The STEM track, which is taught using an interdisciplinary and applied approach, "is designed to produce graduates of secondary level who will take science, research, mathematics and engineering related courses in tertiary level and thereby add to the scientific and scholarly workforce of the country (Estonanto 2017).

However, a study published in December 2020 raised the concern about a growing number of STEM students who chose to pursue non-STEM degree programs in college or university as well as "students who entered college with the original aim of pursuing a STEM field career who drop out of school or choose a non-STEM program." (Rafanan, de Guzman, and Rogayan, "Pursuing STEM Careers: Perspectives of Senior High School Students" in Participatory Educational Research (PER), Vol. 7(3), pp. 38-58, December 2020). The study further reports that:

In the Philippines, STEM graduates are insufficient; hence, the country does not have sufficient scientists (Anito, Morales & Palisoc, 2019). The Philippines only has 189 scientists per million which is very low compared to the UNESCO recommendation which is 380 per million (Anito et al., 2019). The low number of scientists in the country is greatly attributed to the low graduates of STEM-related careers. The Commission on Higher Education (CHED) report revealed that the completion rate across STEM areas based on the average 5-year data until 2016-2017 is only 21.10%. In particular, sciences had a completion rate of 25.52% followed by mathematics (21.20%), information technology (19.56%), engineering and technology (18.97%), and medical and allied fields with 14.38%. This scenario is further validated by EduTECH (2016) that the Philippines is experiencing shortages in the workforce in the field of STEM (2020).

In the STEM program which was designed to prepare students who express keen interest in taking college degrees focused on Science, Technology, Engineering, and Mathematics (STEM), senior high school students will be exposed to learning activities that will hone their knowledge and skills in analyzing data, understanding real-world impacts, and conducting research (<a href="https://www.onlineshs.com/stem/">https://www.onlineshs.com/stem/</a>). STEM education attempts to produce K- 12 graduates who are "globally competitive" and gainfully employed. The so-called hope of the country is expected to acquire knowledge and skills in problem-solving, analysis of data, and application of evidences to make decisions.

In the 2021 APEC STEM-Plus for Women and Girls Webinar in March, it was reported that:



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Educational institutions in the Philippines are gradually recognizing the relevance of STEM education in supporting the government's thrust for innovation to drive economic growth. Thus, in a bid to increase the number of graduates who enroll in STEM-related courses at the tertiary level, the Department of Education designed a STEM strand under the K-12 Academic Track of the Senior High School. The STEM strand will provide students with the fundamental concepts related to science, technology, engineering and mathematics. Students study subjects in Biology, Physics, Chemistry, Calculus, Technology, and Research which will prepare them from taking college courses related to Applied and Pure Sciences, Engineering, IT and Mathematics. Moreover, the STEM strand paves the way for broader opportunities for students in basic education to learn and practice science and mathematics, which can prepare them for global education and employment, as well as entrepreneurship (Conrado Rotor, Jr. "STEM- Update: Philippines" in https://www.apecstemplustw.org/blog/stem-update-philippines).

It was further added that getting more students to enroll in STEM is still a major challenge. The same report also indicated a gender gap in STEM enrollment—there was a need to encourage more women/girls to pursue STEM ins senior high school and pursue STEM courses in college. This was due to the reality-the-ground that STEM courses are male-dominated (Rotor, Jr. 2021).

Thus it is salient to explore and find out the perspectives, inclinations, and decision of Filipino K11 to K12 students to pursue Science as an academic pursuit in college/university and as a career path.

#### BACKGROUND AND RATIONALE

#### Learnings from Year I

The Year I generated important data as well as salient insights on how selected K3 to K6 basic education students perceived Science and looked at their levels of appreciation and the relevance of Science in their academic pursuits that could influence them to pursue a Science career or Science-related endeavors.

It covered the period January 2020 to February 2021. K3 to K6 students were specifically selected for the study because of the need to examine their formative years of Science education, which commonly starts on their third year of elementary education in the Philippines. Additionally, it further investigated the following aspects:

The students' perception, attitude, awareness, and knowledge in Science;

- 2. The student's experiences in learning Science; and
- 3. The student's inclination to pursue Science.

Overall, Year 1 reveals that K3-K6 students have neutral to positive perceptions about and attitudes on Science. They also exhibited neutral to positive scores on their awareness and knowledge of Science. This illustrates that Filipino K3-K6 students expressed neutral to positive sentiments to the statements measuring their (1) Perception about Science, (2) Attitude on Science, (3) Awareness of Opportunities in Science, (4) Knowledge about Science, (5) Perceived Competency of Science Teachers, (6) Parental Support in Learning Science, and (7) Inclination Towards Scientific Opportunities. There were no statements that the students found negative.

However, the FGDs reveal that generally, K3-K6 students have a shallow understanding of science. This is quite understandable since they are just beginning their journey in the realm of Science. Most of them recalled terms that were taught inside the classroom but did not know how to characterize, explain, and even relate these with one another. Results indicate students' difficulty in absorbing science concepts and thinking about them in creative and innovative ways. The negative notions about science as a difficult subject are not new issues anymore, but it is important to note how such negativities can be dispelled by effective teaching. In other words, the skill of the teacher can make all the difference. While science is perceived to be a difficult subject, a good teacher can make it enjoyable for students, and amplify student interest.

Year I posed great challenges to the research team. When the research was conceived as early as late 2019, it was envisioned that all methodological procedures of the research would be implemented on an in-person face-to-face manner. Year I was greatly affected by the pandemic that has put to a brief standstill the main participants of the project – the schoolchildren and the schools. A reassessment of strategies had to be made because the project team had to shift to using online platforms in administering the interviewer-administered survey, conducting the FGDs with participating schoolchildren and the conduct of the Key Informant Interviews through online platforms using Google Meet, Zoom, and in some cases through phone calls, instead of the proposed face-to-face survey. However, these were challenges that were surmounted by the research team despite some delays and problems in getting all participants for the study.

#### Learnings from Year 2

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For Year 2, the focus was on K7 to K10 students. These are students who are in the age bracket of 11 years old to 17 years old. These are recognized as the teenage years. And the youth in this age range are now at the threshold of discovery. In school, they are engaged in a multitude of educational activities that provides them with opportunities to explore their aptitudes and skills in leadership.

The Year 2 study unveiled an assortment of factors and contexts on why K7 to K10 students would pursue a STEM or science-related track in their studies. Generally, these can be categorized as:

- a) teachers and their teaching styles and attitude,
- b) educational environment, such classroom conditions, facilities, and activities,
- c) the students' own interests and dreams, and
- d) involvement of other stakeholders, such as the parents, family members, LGUs and funders.

On the study's objective of determining the interest and inclination of the students to take up science courses, it was found out that they tend to look into their future and would take STEM to ensure or achieve their dreams. Students who have good learning environment and have access to financial support are more inclined to take STEM courses.

On the objective of exploring the push and pull factors that will encourage students to pursue or not pursue STEM tracks, the researchers observed that pull factors can become push factors and vice versa. For instance, they dream of being doctors, engineers, and architects, but also want careers outside science such as law, accounting, teaching, and culinary professions and those that pay well. Moreover, while they find science a difficult subject, the majority finds it interesting. The presence of a good teacher is necessary, but a poor one would make them lose interest in Science.

A factor that was explored by the study included the situation of students amidst the COVID-19 pandemic and how they cope with the remote learning setup. During the pandemic, there are expectations for teachers to be more understanding and accommodating given that not all students have neither gadgets nor internet connections. While there are modules that students with no Internet could work on, the quantity and quality of learning modules are wanting. The parents who are expected to assist them in their modules, were either not qualified or do not have the time to support their children in understanding the

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What factors and in what contexts will K11 to 12 students be inclined and decide to pursue a Science or Science-related track in College/University and as a career path?

Specifically, the objectives of this Year 3 project are as follows:

- 1. To determine the inclination and decision of the students to take up science or science-related degree programs in college/university or as a career path:
- To identify the factors and the reasons that will make the students choose science or science-related degree programs in college university or as a career path;
- 3. To describe the decision-making process of the students in selecting their science or science-related degree program in college/university or as a career path; and
- 4. To find out the role of teachers, parents, peers, other stakeholders and other influencers or conditions in facilitating or hindering the choice of junior and senior students in pursuing a science or science-related degree program in college/university or as a career path.

#### Methodology

The above objectives will be achieved through a triangulated Research Design that will fuse together the results of quantitative and qualitative methods. Particularly, the project will employ online survey. Focus Group Discussion and Key Informants Interview, additionally, it will use records or documents review to enrich further the results of the study.

The coverage of the study will be nationwide with samples to be drawn from the regions that exhibited the lowest level of aptitude in science based on the PISA study. Survey respondents will total 1,200 from public and private schools, distributed in 10 regions.

To determine the students' perception, inclination and decision to pursue Science or Science-related degree programs in college/university, a total of eight (8) focus group discussions among K11 to K12 students will be facilitated from four (4) regions. Each group will comprise 6 to 10 students who will share their insights on topics like their favorite subjects and science topics, perception and interests, their chosen degree programs, their future career plan, health condition, STEM track, their science teachers, and other influencers and the remote learning setup during the COVID pandemic.

Sixteen (16) key informant interviews will be conducted from four (4) selected regions. Principals and science teachers or coordinators and other stakeholders will be interviewed online in accordance with the KII guide formulated by the team.

The major concepts and indicators that will be explored in the FGD and KII are divided into the following sections:

- a) Profile of the School and students:
- b) Inclination, decision and choice of Degree program;
- c) Decision-making factors and process, and
- d) Facilities and Teaching Materials, influencers, environment and other conditions Survey questionnaires, FGD and KII Guides will be formulated to capture the variables and concepts under study. These will be pre-tested and will be used in data collection.

Pre-tested instruments such as survey questionnaires, FGD and KII Guides will be used in data collection. Questionnaires and Guide questions will be drawn to capture the variables and concepts under study. Survey responses will be encoded and analyses will be based on frequencies, cross tabulations, tests of association of selected variables, and regression. FGDs and KIIs will be recorded with permission of the participants and informants. These will be transcribed verbatim and the transcriptions will be organized into themes for the write-up.

#### References:

Estonanto, Aldrin John Jao, "Acceptability and Difficulty of the STEM Track Implementation in Senior High School" in Asia Pacific Journal of Multidisciplinary Research: Vol. 5 No.2, 43-50 May 2017.

Rafanan, de Guzman, and Rogayan, "Pursuing STEM Careers: Perspectives of Senior High School Students" in Participatory Educational Research (PER), Vol. 7(3), pp. 38-58, December 2020.

Conrado C. Rotor Jr., "STEM+ Update: Philippines" in APEC-STEM Plus Education for Women and Girls Webinar, Asia Pacific Economic Cooperation (APEC) March 2021.

https://www.onlineshs.com/stem/

https://www.apecstemplustw.org/blog/stem-update-philippines

# Republic of the Philippines



# MEMORANDUM

TO

REGIONAL DIRECTORS

Regions I, III, V, VI, VII, VIII, IX, XI, XII, and NCR

FROM

Undersecretary

Field Operations, Palarong Pambansa Secretariat, and DEACO

SUBJECT

REQUEST OF THE UP COLLEGE OF MASS COMMUNICATION FOUNDATION. INC. FOR **ENDORSEMENT** RESEARCH "A STUDY TITLED PROJECT THE INCLINATION AND DECISION OF FILIPINO K11 TO K12 STUDENTS IN THE PHILIPPINES TO PURSUE SCIENCE IN COLLEGE/UNIVERSITY AND AS A CAREER PATH (YEAR 3)"

DATE

March 8, 2022

This Office respectfully endorses the attached letter addressed to Secretary Leonor Magtolis Briones from Dr. Arminda V. Santiago, Project Leader and President of UP College of Mass Communication Foundation, Inc. (UP CMCFI), dated February 16, 2022, which was received by this Office on March 8, 2022, regarding their request for the participation of teachers and students in survey interviews, focus group discussions, and key informant interviews. Further, these shall be done online or remotely, for the continuation of their project, which is currently on its third and last year.

The research study titled "A Project on the Inclination and Decision of Filipino K11 to K12 Students in the Philippines to Pursue Science in College/University and as a Career Path (Year 3)", still in partnership with the Department of Science and Technology - Science Education Institute (DOST-SEI), aims to answer what factors and in what contexts will Grade 11 to 12 students be inclined and decide to pursue a Science or Science-related track in College/University and as a career path.

For queries and concerns, kindly contact Ms. Katrina Ramos at (+632) 8981-8500 local 2678 or at up.cmcfi@gmail.com.

For your reference and appropriate action.