

A FEASIBILITY STUDY ON THE UNIVERSITY OF SCIENCE AND TECHNOLOGY OF THE SOUTHERN PHILIPPINES OFFERING A BACHELOR OF ELEMENTARY EDUCATION MAJOR IN SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM)

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ABSTRACT: *Science, technology, engineering, and mathematics (STEM) curricula are in high demand in an ever-changing, sophisticated technological world. Teachers that specialize in STEM subjects are also very useful. This study aimed at determining the viability of offering a new academic program Bachelor of Elementary Education (BEEd) major STEM in terms of management, market, financial, and operations aspects. This study employed a descriptive survey research design using an online survey questionnaire to 102 randomly selected students, basic education teachers, and college instructors in the region. Based on the findings, concluded that the opening of the BEEd-STEM program was feasible with respect to its management, marketability, financial and operational aspects viability. With this, the College of Science and Technology Education can proceed to its steps in developing the curriculum for the BEEd-STEM program incorporating the established processes like DACUM (Developing a Curriculum). It is hoped that the future graduates of this program meet the changing demands of time and are able to compete in job placement here and abroad. In addition, the university's facilities in terms of instruction, research, and extension should be continually improved to address gaps towards the assurance of total quality outcomes. The faculty should also be exposed to continuous faculty professional development. A future feasibility study can replicate the method used in this study and may include other aspects not mentioned in this study.*

Keywords: Bachelor of Elementary Education (BEEd) major in STEM (Science, Technology, Engineering, and Mathematics), feasibility study, management viability, marketability, financial viability, operational aspects viability

1. INTRODUCTION

By virtue of Republic Act, 10919 through the amalgamation of the Mindanao University of Science and Technology (MUST) in Cagayan de Oro City, Misamis Oriental and the Misamis Oriental State College of Agriculture and Technology (MOSCAT) in Claveria, Misamis Oriental, the state university, University of Science and Technology of Southern Philippines (USTP) was established last August 16, 2016. Both campuses are in Northern Mindanao, the Gateway to Mindanao, which provides the institution with a strategic locational advantage in training and developing students from all over Mindanao.

Anchored in the USTP Vision 2030 and Framework which addresses the labor market conditions, reduces unemployment, and produces quality manpower in the field of science and technology who can effectively contribute to the national economy, the College of Science and Technology Education initiates to offer the program Bachelor of Elementary Education major in Science, Technology, Engineering and Mathematics (STEM).

The college initiated to offer this BEED-STEM program for various reasons. As the observed majority of science and mathematics teachers in the elementary are not specializing in science or mathematics as their major field of specialization [1]. With this, it cannot be presumed that elementary science and mathematics teachers possess the prerequisite conceptual and procedural knowledge needed to be competent to teach the subject. Science and mathematics concepts demand an in-depth understanding of its basic ideas but because the majority of elementary teachers are non-majors of science and mathematics, they need to be trained well in terms of the content areas but training could not be good enough as evidenced by the poor performance of Filipino students in the national and international large scale

assessment comparisons. Hence, it is for these reasons that there is a need to offer an education program designed for elementary teachers who will specialize in STEM courses and one of the initial steps for the development of this program was to conduct a feasibility study, hence, this research. This feasibility study looked into the viability in terms of management, market, financial, and operations aspects of the new academic program BEED STEM.

2. LITERATURE REVIEW

Before an academic program can be opened, colleges and universities took an initial step on conducting a feasibility study to examine the practicability, viability, marketability, and responsiveness to the needs of the community of offering the new program. This review focus on the feasibility studies which are conducted in the Philippines and internationally to establish the relatedness and gaps in conducting this feasibility study of offering an education program designed for elementary teachers who will specialize in STEM courses.

In the feasibility conducted by Balingbing on offering a Bachelor of Arts in Information Technology (With Business Track on Business Processing Outsourcing) conclude that offering ABIT with BPO specialization is feasible since the external and internal aspects are favorable, the needed facility and faculty are available and no other school in Camarines Sur offers it. The administration supports the new program as part of the College's mandates and as stipulated in its 2014-2018 Strategic Development Plan [2].

Al-Badarneh, Spohrer, Al-Duwairi, & Shatnawi conducted an analysis study of the feasibility of offering a bachelor's degree in Service Science, Management, and Engineering (SSME) in response to the growing dominance of the service sector in emerging economies and they concluded that the demand for hybrid IT graduates in the knowledge-based service economy is rapidly growing. They also suggested that

there is a need to establish international curricular guidelines for a new Bachelor's degree in SSME that will match the latest developments in the discipline and have a lasting impact [3].

In another feasibility study conducted by Pariñas & Bestre of the offering of Master of Science in Criminal Justice with Specialization of Criminology at the University of Northern Philippines. Findings showed there are 371 or 93.21% interested applicants in the province; there are enough faculty members to handle the different subjects; there are adequate library materials and physical facilities that promote scholarly research; and the University has a well-defined policy on admission and retention. The proposed offering is very much feasible [4].

With the above research studies reviewed, this present study showed some similarities and differences depending on how the study was conducted. However, these research studies shared the same objective on offering the particular program in their school, college, or university.

3. METHODOLOGY

This study employed a descriptive survey research design. The feasibility study survey questionnaire was administered online using Google Forms to the randomly selected 102 respondents which represents the group of students, elementary and high school teachers as well as college instructors to ensure well representation from these groups. The target respondents were given the survey questionnaire online link through Facebook, Messenger, and emails. The respondents are also given informed consent of the survey conducted and ensure that the data would be used for research purposes only and their identity was kept confidential in compliance with the Republic Act 10173 also known as the Data Privacy Act of 2012. The data that was collected was analyzed using descriptive statistics such as frequency, percentage, mean and standard deviation.

4. RESULTS AND FINDINGS

The findings of this feasibility study was shown in the following tables and figures.

Table 1: Profile of the Respondents

Profile		Frequency (f)	Percentage (%)
Sex	Male	37	36.27
	Female	65	63.73
Age	50 and above	4	3.92
	40-49 years old	7	6.86
	30-39 years old	25	24.51
	29 and below	66	64.71
Civil Status	Single	74	72.55
	Married	28	27.45
Educational Qualification	Doctorate Degree	7	6.86
	Master's Degree	10	9.80
	College Graduate	42	41.18
	College Level	43	42.16
Professional License	Licensure Exam for Teachers (LET)	88	86.27
	None	14	13.73
Work Affiliation	Public/Government	49	48.04
	Private	9	8.82
	Not Applicable	44	43.14
Current Work/Position	College Instructor	13	12.74
	HS Teacher	43	42.16
	Student	42	41.18

Table 1 shows the profile of the respondents. It can be gleaned from the table that majority of the respondents are a single female who belonged to the 29 years old and below age bracket and has already passed the Licensure Examination for Teachers (LET). Further, many of these respondents work in public or government offices or work as high school mathematics teachers.

Table 2. Frequency and Percentage Distribution of the Management, Market, Financial and Operational Aspects Viability of the BEEd-STEM Program

Viability Indicators	Strongly Agree	Agree	Disagree	Strongly Disagree
Management				
There are qualified faculty to handle subjects in the BEEd-STEM	65 (63.7%)	33 (32.4%)	0 (0%)	4 (3.9%)
The administration and management of the College of Science and Technology Education as well as the department that will handle the program are highly competent.	68 (66.7%)	29 (28.4%)	2 (2%)	3 (2.9%)
Marketability				
The BEEd-STEM program is highly in demand in the next 5 years.	58 (56.9%)	39 (38.2%)	2 (2%)	3 (2.9%)
Graduates of the BEEd-STEM are highly employable in both private and public institutions.	55 (53.9%)	38 (37.3%)	6 (5.9%)	3 (2.9%)
Graduates of Senior High School are interested to pursue the BEEd-STEM program.	31 (30.4%)	61 (59.8%)	8 (7.8%)	2 (2%)
Financial Viability				
There is no tuition fee cost because USTP is a state university.	102 (100%)	0 (0%)	0 (0%)	0 (0%)
There are scholarships available for students who intend to enroll in the BEEd-STEM program.	59 (57.8%)	35 (34.3%)	4 (3.9%)	4 (3.9%)
Operational Aspects				
There are instructional facilities available for the BEEd-STEM program.	57 (55.9%)	40 (39.2%)	3 (2.9%)	2 (2%)
The university is very accessible for students.	68 (66.7%)	30 (29.4%)	2 (2%)	2 (2%)
Students in the BEEd-STEM program are mentored by education experts.	68 (66.7%)	30 (29.4%)	1 (1%)	3 (2.9%)
There are adequate facilities and equipment available in the college.	59 (57.8%)	39 (38.2%)	2 (2%)	2 (2%)
The BEEd-STEM students are expected to have practical teaching experience in the field.	74 (73.3%)	23 (22.8%)	1 (1%)	3 (3%)

It can be gleaned from the table that in terms of the management viability, the majority of the respondents strongly agreed that there are qualified faculty to handle subjects in the BEEd-STEM. They also strongly agreed that the administration and management of the College of Science and Technology Education as well as the department that will handle the program are highly competent. This means that the management viability was feasible according to the respondents.

In terms of the marketability of the BEEd-STEM program, the majority of the respondents strongly agreed that the BEEd-STEM program is highly in demand in the next 5 years and the future graduates are highly employable in both private and public academic institutions. They also agreed that the future graduates of Senior High School are interested to pursue the BEEd-STEM program. This means that the marketability of the BEEd-STEM program was feasible according to the respondents.

Next, in terms of the financial viability of the BEEd-STEM program, the respondents strongly agreed that there is no tuition fee cost because USTP because it is a state university and there are scholarships available for students who intend to enroll in the BEEd-STEM program. Hence, with regards to the financial viability of the BEEd-STEM program, it was feasible according to the respondents.

Finally, with regard to the operational aspects of the BEEd-STEM program, the respondents strongly agreed that there are instructional facilities available for the BEEd-STEM program, the university is very accessible for students which

they will be mentored by education experts. There are also adequate facilities and equipment available in the college and they are expected to have practical teaching experience in the field. Hence, the operational aspects of the BEEed-STEM program were feasible as perceived by the respondents.

BEEed-STEM Program Respondents' Perceptions

The following are the verbatim comments and suggestions of the respondents on the opening of the BEEed-STEM program.

"It would be great especially that there are schools which offer stem sections in the elementary level",

"They need to have a good start in opening this program, but the best instructors to manage this program so that it will be a good one",

"Hire more teachers because the CSTE faculties are competent to teach college students yet they are not enough to handle a lot of students",

"I firmly believe that the strong foundation in areas of STEM will start in the basic education which is in the elementary. Thus, it is important to have teachers in the elementary specialized in STEM in order to cater to the demand on quality education in the Philippines",

"This program should be open not only for students who were enrolled in STEM during SHS but also to everyone who wish to teach mathematics",

"This program will certainly equip future elementary educators with knowledge and skill that will help young learners to master science and mathematics",

"It's a good idea to pursue this program to produce more STEM professionals in the future",

"BEEed-STEM is vital for the improvement of S&T in the country and increase the knowledge of the young minds to become scientists in future",

"Elementary curriculum in the next 5 years or so will definitely give more emphasis on STEM-based activities according to the current shifts in education we experience today. Thus, this course offering will entice many students and overall can help improve STEM culture in our country/community",

"This BEEed-STEM program is interesting because aside from the fact that the CSTE department has competent faculties, it will help STEM senior high graduates to use and practice what they've learned during their senior high level. And also, the said program might attract those students to take STEM and I am also curious about this one",

"It would be really helpful if we establish this kind of program to be able to produce many competent teachers that are suitable for their specialization",

"It is good that the university will open a BEEed-STEM program since this course is highly employable in both public and private schools,

"BEEed STEM- this is a good course to be offered to the senior high school graduates who took the STEM strand. It could develop their ideas and can be equipped with enough knowledge to impart to the learners of the new generation".

Based on the comments and suggestions of the respondents, they are favorable to the opening of the BEEed-STEM program because it is timely and relevant, and responsive to the needs of the community. They also noted that graduates of this program are highly employable in both public and private academic institutions. They thought that having a specialized program for STEM could be an answer to the demand for quality education in the Philippines because as of now, elementary teachers are generalist in nature and they are

not specializing in STEM and might be one of the factors why pupils still lag behind in national and international comparison assessments.

5. CONCLUSIONS & RECOMMENDATIONS

In reference to the findings and the comments and suggestions of the respondents, it could be concluded that the opening of the BEEed-STEM program was feasible with respect to its management, marketability, financial and operational aspects viability. With this, the College of Science and Technology Education can proceed to its steps in developing the curriculum for the BEEed-STEM program incorporating the established processes like DACUM (Developing a Curriculum). It is hoped that the future graduates of this program meet the changing demands of time and are able to compete in job placement here and abroad. In addition, the university's facilities in terms of instruction, research, and extension should be continually improved to address gaps towards the assurance of total quality outcomes. The faculty should also be exposed to continuous faculty professional development. A future feasibility study can replicate the method used in this study and may include other aspects not mentioned in this study.

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REFERENCES

- [1] Tandog, V.S.J., Maglipong, C.V., & Roble, D.B. (2017). Profound Understanding of fundamental mathematics (PUFM) among K-5/6 mathematics teachers. *Journal of Scientific Research and Development* 4 (1): 35-38.
- [2] Balingbing, A. B. (2014). A Feasibility Study on Offering Bachelor of Arts in Information Technology (With Business Track on Business Processing Outsourcing). *Asia Pacific Journal of Education, Arts and Sciences*, 1(1), 64-69.
- [3] Al-Badarneh, A., Spohrer, J., Al-Duwairi, B., & Shatnawi, M. (2018). An Analysis Study of the Feasibility on Offering Bachelor's Degree in Service Science. *EURASIA Journal of Mathematics, Science and Technology Education*, 14(6), 2639-2652.
- [4] Pariñas, M. M., & Bestre, S. C. (2020). Feasibility Study on the Offering of Master of Science in Criminal Justice with Specialization in Criminology at the University of Northern Philippines. *UNP Research Journal*, 24(4), 31-44.