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Cebu Normal University MS Mathematics Graduates: A Tracer Study

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ABSTRACT

This paper unveils the outcomes of a tracer study conducted on graduates who completed the Master of Science in Mathematics (MS Math) program at Cebu Normal University between 2015 and 2021. The primary objective of this tracer study is to discern the evolution in the career trajectories of these graduates, serving as a foundational element for evaluating the effectiveness of the MS Mathematics program at Cebu Normal University.

Keywords: *tracer study, MS Mathematics, mathematical skills and data competencies, analysis, financial modeling, occupational qualifications*

INTRODUCTION

In the realm of human resource development, academic institutions bear the responsibility of monitoring the progress and impact of their graduates. This essential task aids in assessing the effectiveness of educational programs on individuals, institutions, and the broader societal landscape. Tracer studies emerge as a pivotal tool for evaluating diverse degree programs within Higher Education Institutes, providing invaluable insights essential for quality assurance and curriculum enhancement (Schomburg, 2003).

The Master of Science in Mathematics (MS Math) program at Cebu Normal University was initiated in 2009; however, its initial years were marked by challenges, notably a scarcity of qualified faculty. The Commission on Higher Education (CHED) underscored this deficiency during an evaluation in 2013, mandating the hiring of proficient faculty members. Subsequently, the department welcomed Dr. Roberto B. Corcino and Dr. Cristina B. Corcino in 2014, both Ph.D. graduates specializing in Enumerative and Analytic Combinatorics and Asymptotic Analysis. Over the next seven years, the program thrived, producing eight graduates with published theses in ISI/Scopus-indexed journals. Despite these accomplishments, an evaluation is imperative to assess the program's impact on graduates, particularly their performance in the professional arena.

Chen (1996) emphasizes that information derived from evaluation is instrumental in process improvement, recommending adjustments to program structures and implementations. Patton (1986) similarly highlights the significance of program evaluation, describing it as the systematic collection of information crucial for reducing uncertainties, enhancing effectiveness, and informing decision-making.

Interestingly, despite the program's achievements, the CNU Mathematics Department has not conducted a tracer study for MS Mathematics graduates. This gap in knowledge prompts the present authors to initiate a tracer study, aiming to ascertain whether graduates have acquired the requisite skills, knowledge, and attitudes essential for global competitiveness in roles such as mathematics teachers, researchers, and analysts. The study also seeks to evaluate the graduates' alignment with the vision and mission of Cebu Normal University.

The present authors aspire to track the graduates' performance to serve as a foundation for refining the MS Mathematics curriculum. Specifically, the study aims to present graduates'

profiles in terms of demographics and employability while exploring their perceptions regarding competencies developed at CNU, instilled values, and identified areas for further skill development. This tracer study stands as a crucial step in understanding the long-term impact of the MS Mathematics program and informing continuous improvements to meet the evolving needs of both graduates and the institution.

METHODOLOGY

The research design employed in this tracer study is of a descriptive nature, as it aims to collect and present factual information pertaining to the demographics of MS Mathematics graduates. Additionally, it seeks to explore their perceptions regarding competencies, values instilled by the university, and identify areas for further skill development. The primary respondents for this study are MS Mathematics graduates spanning from the school year 2015-2016 to the school year 2020-2021.

The data collection instrument comprises three sections. The initial section gathers personal information, encompassing (a) year of graduation, (b) permanent address, (c) contact numbers, email address, and whether the graduate pursued further studies or alternative courses. The second section delves into employment details, including (a) a description of the current position in paid work, (b) the perceived usefulness of knowledge and skills acquired from CNU in the current job, and (c) the satisfaction level with the current job. The third section assesses the graduates' current employment status and evaluates the training received, covering aspects such as (a) details of the current employer, (b) occupational classification, (c) job status, (d) monthly income range, and (e) the perceived contribution of the CNU program to personal and professional growth.

To facilitate the distribution of the questionnaire, the researcher personally distributed it or made contact using the graduates' cell phone numbers or email addresses. The questionnaire was made available as a downloadable PDF document, allowing graduates to conveniently fill it out and return it either as an email attachment or as hard copies sent by post. Despite the graduates' busy schedules, it is assumed that they will respond to the questionnaires honestly and truthfully, ensuring the validity and reliability of the study.

RESULTS AND DISCUSSIONS

Within this section, we will present the collected data from MS Mathematics graduates. The information will be systematically organized and classified into two main categories: graduates' profiles and their perceptions. The study comprises a total of 8 respondents, and the gathered data is detailed below. The profile category is further subdivided into demographics and employability.

Demographic Profile

The following table presents the civil status of the MS Mathematics graduates:

Table 1. Civil Status of the Respondents

Civil Status	Frequency	Percentage (%)
1. Single	8	100%
2. Married	0	0%
3. Separated	0	0%
4. Widow(er)	0	0%

Table 1 shows that all graduates of MS Mathematics program in CNU are still single. The next table presents the gender of the respondents:

Table 2. Gender of the Respondents

Gender	Frequency	Percentage (%)
1. Male	1	12.5%
2. Female	7	87.5%

Table 2 shows that majority of the respondents are female graduates. The next table presents the year of graduation of the respondent:

Table 3. Year of Graduation of the Respondents

Year	Frequency	Percentage (%)
2021	3	37.5%
2020	0	0.0%
2019	2	25.0%
2018	3	37.5%
2017	0	0.0%

Table 3 illustrates a minimal number of graduates per year between 2017 and 2021. This underscores the need for CNU to broaden the promotion and advertising efforts for its MS Math program.

Employability Profile

The following presents the current employment status of the respondents:

Table 4. Current Employment Status of the Respondents

Present Status	Frequency	Percentage (%)
Employed	8	100%
Not Employed	0	0%
Self-Employed	0	0%

Table 4 shows that all graduates of MS Mathematics program in CNU are employed. The next table presents the type of employment or job status:

Table 5. Type of Employment or Job Status

Job Status	Frequency	Percentage (%)
Permanent	6	75%
Temporary	2	25%
Contractual	0	0%
Job Order/Casual	0	0%
Self-Employed	0	0%

Table 5 reveals that majority of the graduates of MS Mathematics program in CNU (80%) are already in permanent status. The next table presents their job or occupational classification:

Table 6. Occupational Classification

Job Classification	Frequency	Percentage (%)
Official Government and Special-Interest Organizations.	0	0%
Corporate Executive or Manager	1	12.5%
Managing Proprietor or Supervisor	1	12.5%
Technician or Associate Professional	1	12.5%
Clerk	0	0%
Service Worker	0	0%
CPA or Lawyer	0	0%
Trader or Related Worker	0	0%
Plant and Machine Operator and Assembler	0	0%
Laborer or Unskilled Worker	0	0%
IT or Web developer and the like	0	0%
Professional Teacher	5	62.5%
Architect or Engineer	0	0%

Table 6 reveals that majority of the graduates of MS Mathematics program in CNU (62.5%) are professional teachers. Two of them are occupying managerial and supervisorial positions. That means, these graduates are promoted quickly because they are highly analytical. The next table presents type of organization where they are employed:

Table 7. Type of Organization where Graduates are Employed

Type of Organization	Frequency	Percentage (%)
Government/Public	3	37.5%
Private	5	62.5%
NGO/INGO	0	0%
Self-Employed	0	0%

Table 8. Rates of Contribution of the Degree Program to the graduates' personal and professional growth

SN	Particulars	Weighted Average	Rating
1	Enhanced academic Profession	3.75 ≈ 4	Very High
2	Improved problem-solving skill	3.625 ≈ 4	Very High
3	Improved research skills	3.75 ≈ 4	Very High
4	Improved learning efficacy	3.625 ≈ 4	Very High
5	Improved communication/ interpersonal skills	3.25 ≈ 3	Highly
6	Improved information technology skills	3	Highly
7	Enhanced team spirit/people skill	3.125 ≈ 3	Highly
8	Meeting present and future Professional skills	3.5 ≈ 4	Very High
9	Exposure to local community within field of specialization	3.375 ≈ 3	Highly
10	Exposure to International Community within the field of Specialization	3.375 ≈ 3	Highly
11	Critical Thinking Skill	3.875 ≈ 4	Very High
12	Salary Improvement And Promotion	3.125 ≈ 3	Highly
13	Opportunity Abroad	2.75 ≈ 3	Highly
14	Personality Development	3.25 ≈ 3	Highly

As illustrated in Table 8, respondents in this study asserted that the degree program significantly contributed to their personal and professional growth. Specifically, they reported very high rates of contribution in terms of enhanced academic proficiency, improved problem-solving skills, heightened research skills, increased learning efficacy, meeting present and future professional requirements, and enhanced critical thinking abilities. Additionally, the rates of contribution were deemed high concerning improved communication/interpersonal skills, enhanced information technology skills, heightened team spirit/people skills, exposure to the local community within the field of specialization, exposure to the international community within the field of specialization, salary improvement and promotion, opportunities abroad, and personality development. These favorable results can be attributed to the MS Mathematics program at CNU, which has been overseen by competent and well-published mathematics professors, maintaining high standards and possessing the highest educational qualifications. The endorsement of the usefulness of knowledge and skills acquired from CNU in their jobs, as indicated in Table 9 below, further affirms these ratings:

Table 9. Rates of Usefulness of the Knowledge and Skills Learned from CNU to the Graduates Job

SN	Particulars	Weighted Average	Rating
1	Usefulness of the knowledge and skills learned from CNU to their jobs	3.75 ≈ 4	Very Much

Furthermore, the specialized mathematical skills acquired by MS Mathematics graduates from CNU have made them highly sought-after in private companies, often commanding higher salaries. As shown in Table 7, there are more MS Mathematics graduates employed in the private sector than in government sectors. This trend can be attributed to the significant demand within private agencies for MS Mathematics graduates skilled in areas such as data analysis, financial modeling, and algorithm development. With a greater number of MS Math graduates in these sectors, there is a better alignment between skill demand and supply, resulting in increased efficiency and effectiveness in addressing industry-specific challenges.

CONCLUSION AND RECOMMENDATIONS

Based on the findings of the tracer study, the respondents, predominantly single females who graduated between 2017 and 2021, represent a group with a minimal number of graduates. Recognizing this, there is a crucial need to establish a mentoring program specifically tailored for MS Mathematics graduates in CNU, particularly those employed as teachers in academic institutions. Despite their minimal number, the study reveals that these graduates are employable and exhibit commendable performance, evidenced by their sustained tenure and swift promotions within their respective organizations. Consequently, the existing MS Mathematics curriculum does not require revision, given the positive outcomes reported by the graduates.

However, the recent release of a new CHED Memorandum Order (CMO) for the MS Mathematics program, aligned with the implementation of the additional two-year Senior High School program in the Philippines, necessitates curriculum adjustments. Therefore, despite the positive feedback from MS Mathematics graduates, it is imperative for the Mathematics Department to revise the curriculum to comply with the new CMO.

The recommendations include revisiting and enhancing the curriculum to further refine the skills and competencies expected of MS Mathematics graduates. The school's formation program should be subject to improvement mechanisms, with regular feedback sought from graduates by the alumni department. This feedback will serve as a basis for ongoing instructional enhancements to address industry needs.

Given the limited number of graduates annually from 2017 to 2021, it is essential for CNU to expand promotional efforts for the MS Math program. Additionally, the institution should consider introducing a graduate teaching or research assistantship program. Seeking inclusion as one of the institutions offering the DOST scholarship for the MS Math program is also advisable. These initiatives will not only attract more students but also contribute to the overall success and reputation of the program.

REFERENCES

Chen, H. (1996). A Comprehensive Typology for Program Evaluation American Journal of Evaluation 17: 121-130.

Patton, M.Q. (1986). *Utilization-focused Evaluation.* Beverly Hills, California: Sage Publications.

Schomburg, H. (2003). Handbook for Graduate Tracer Studies: Centre for Research on Higher Education and Work, University of Kassel, Germany *http://www.qtafi.de/handbook _v2.pdf*