

Employability of Mathematics Majors from a State University's Bachelor of Secondary Education Program

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Abstract. This study traced the employability of Bachelor of Secondary Education, Major in Mathematics Graduates of a Philippine state university. One hundred respondents were surveyed using a questionnaire distributed via Google Forms, patterned after the Commission on Higher Education's (CHED) standardized form. The descriptive research design was employed to assess the employment status of the graduates. Among the respondents, 47% are currently employed in government, 34% in private organizations, and 42% are teachers. Additionally, 46% hold permanent positions with an average salary between 20,000 and 30,000 PHP. The study recommends enhancing students' skills in Mathematics, encouraging continuous education to improve their ranking, and seeking diverse job experiences to broaden career opportunities.

Keywords: Employment status; Tracer study; Mathematics major; State University; Employability.

1.0 Introduction

Training institutions commonly use tracer studies to gather feedback on courses, understand how training helps graduates develop competencies, and assess the impact of training on job opportunities and continued education for graduates. Such studies provide valuable information about the relationship between higher education and professional work, assess higher education's relevance, and offer stakeholders insights. They also help fulfill requirements for higher education accreditation and serve as a basis for assessing and enhancing educational programs (Balingbing, 2014).

In January 2019, the unemployment rate in the Philippines was estimated at 5.2%. Of the total unemployed, 43.7% were aged 15–24, and 30.6% were aged 25–34. By educational attainment, 20.9% of the unemployed were college graduates, 8.2% were college undergraduates, and 28.2% had completed junior high school (PSA, 2019). To address job mismatch in the country, the Commission on Higher Education (CHED), in collaboration with universities across the Philippines, mandated the conduct of Graduate Tracer Studies (GTS) to determine the employability of graduates based on their disciplines. Graduate employability is described as a person's capacity and desire to be and remain appealing in the global economy, involving the relative possibilities of obtaining and maintaining certain types of work. In the global economy, the employability of graduates is a crucial issue. Graduates must possess the necessary competencies and skills to be flexible in the changing labor market (CHED).

Higher Education Institutions (HEIs) play a vital role in imparting academic knowledge and helping students achieve their dreams of securing decent jobs after graduation and becoming socially recognized in society (Menez, 2014). HEIs are challenged to balance higher education's development and academic teachings' professional relevance (Melik & Pavlin, 2009). The success of learning is measured through the employability of graduates, the type of employment secured, and the time taken to land their first job (WordPress, 2011). Governments have encouraged educational institutions and employers to collaborate to address employability issues (Lowden et al., 2011). This study traced the employability of Bachelor of Secondary Education (BSED) Mathematics graduates from Negros Oriental State University Guihulngan City Campus between 2017 and 2022. It will enable the department to assess the current programs and provide the best enhancement programs possible.

2.0 Methodology

2.1 Research Design

The researchers employed a quantitative approach using a descriptive survey research design. This approach was deemed suitable as the objective was to track the employment status of graduates. In the survey method, respondents answered questionnaires, which were then retrieved and analyzed to describe and interpret the responses.

2.2 Research Respondents

This tracer study primarily focused on graduates of the Bachelor of Secondary Education Major in Mathematics program at Negros Oriental State University - Guihulngan Campus from the academic years 2017 to 2022. It employed a complete enumeration method since its main goal was to track and monitor the BSED-Math graduates regarding their employability status. There were 14 graduates in 2016, 15 from 2017, 31 graduates in 2019, 14 graduates in 2020, 6 in 2021, and 20 in 2022. The total of respondents in the study was 100.

2.3 Research Instrument

The researchers used a survey questionnaire. The questionnaire was patterned after the Commission on Higher Education (CHED) standardized form and approved for use by the Office of the College of Education. It was subsequently revised and piloted. The revised questionnaire was presented to the three experts in the field of education to identify the content validity. The questionnaire comprised the profile of respondents that included questions on age, gender, civil status, and year of graduation, and the employment profile that included questions on employment status, reasons for unemployment, type of organization, field of work, duration of job search, number of years in the company, job placement, and monthly income.

2.4 Data Gathering Procedure

The researchers administered the survey questionnaire to the respondents using Google Forms after the experts validated it. The researchers clearly explained each item to the respondents throughout the administration of the survey questionnaires, ensuring clarity and understanding to collect accurate answers. Also, the confidentiality of responses was strictly stressed. The researcher tallied and tabulated the data and was subjected to appropriate statistical treatments.

2.5. Data Analysis

To analyze the data, the researchers used frequency and percentage to determine the demographic profile of the respondents, which includes their age, gender, civil status, and year of graduation. They also determined their employment profile, which includes their employment status, reasons for unemployment, type of organizational affiliation, field of work, duration of job search, number of years in the company, job placement, and monthly income.

2.6 Ethical Considerations

The researchers took precautions to ensure the study was done ethically and responsibly. First, the researchers provided consent letters to the respondents, a critical ethical aspect of the study. The letters informed the respondents about the study's goal and its purpose. This guarantees that respondents were fully informed prior to taking part in the survey and had the opportunity to ask questions. Second, the researchers guaranteed the respondent's anonymity while processing and evaluating the data. This is significant because it preserves the participants' privacy and anonymity while encouraging honest and open replies. The researchers took precautions

to guarantee that the replies were processed with strict confidentiality, which would have contributed to the respondents' trust. Finally, the researchers exhibited a strong awareness of ethical concerns and made the required efforts to guarantee that the study was carried out ethically and responsibly.

3.0 Results and Discussion

3.1 Demographic Profile

As seen in Table 1, most BSED-MATH graduates from 2017-2022 are 24-25 years old, comprising 42%. This is followed by graduates aged 26-27 years, making up 21%, and those aged 22-23 years, totaling 17%. Additionally, respondents aged 28-29 accounted for 9%, both 30-31 and 32-33 years old gained a total of 4%, and 38-39 years old with an average rate of 2%. Moreover, respondents aged 34-35 averaged 1%. This implies that most respondents are between 22-27 years old. Age can affect employment opportunities for graduates because it plays a role in the hiring process. One study by Berry (2023) found that age discrimination was prevalent in hiring practices, with older graduates facing more difficulties securing employment. Another study by Lester & Mencl (2014) revealed that younger graduates were more likely to be favored by employers due to perceived greater potential for growth and adaptation to the workplace environment.

Table 1. Descriptive statistics of the demographic profile of the respondents (n= 100)

	Frequency	Percentage
Age		
22-23	17	17
24-25	42	42
26-27	21	21
28-29	9	9
30-31	4	4
32-33	4	4
34-35	1	1
38-39	2	2
Gender		
Male	39	39
Female	61	61
Civil Status		
Single	79	79
Married	21	21
Widowed	0	0
Year Graduated		
2016-2017	14	14
2017-2018	15	15
2018-2019	31	31
2019-2020	14	14
2020-2021	6	6
2021-2022	20	20

Table 1 also shows that most respondents were female, tallying over 61%, with males making up 39%. This implies that most of the BSED-Mathematics graduates surveyed were female. Research shows that females may be more likely than males to participate in online survey research. Further, Table 1 shows that most respondents were single, garnering 79%, compared to 21% of married respondents. As implied, most of the respondents surveyed were single. The researchers found that married men had a 75% lower chance of unemployment than single men, while married women had a 39% lower chance of unemployment than single women (Choi & Esteban, 2017). The study also found that being married increased job search intensity and decreased job dissatisfaction for unemployed men and women (Kim, 2017). However, the study found no significant relationship between being single and unemployment duration (Grossman et al., 2015).

Finally, Table 1 shows that the batch of 2018-2019 has the highest number of graduates, with over 31%, followed by 2021-2022, with 20%, and 2017-2018, with a total of 15%. Furthermore, in the years 2016-2017 and 2019-2020, 14% of total graduates were. The year 2020-2021 had the fewest graduates, with 6%. This implies that 2020-2021 has the least number of graduates. A study conducted by the National Association of Colleges and Employers (NACE) in 2020 found that the COVID-19 pandemic significantly impacted the job market for college graduates. The study reported that the job offer rate for the Class of 2020 dropped by 8.7% compared to the previous year, and the number of job postings decreased by 26.5% in April 2021 compared to April 2019.

3.2 Employment Profile

Employment Status

Table 2 illustrates the employment status of the respondents.

Table 2. Descriptive statistics of the employment status of the respondents (n=100)

Employment Status	Frequency	Percentage
Permanent	46	46
Contractual	15	15
Casual	3	3
Employee by job order	14	14
Temporary	4	4
Unemployed	18	18

The data shows that the majority of the respondents, 48%, were working as permanent or regular employees. This is followed by unemployed respondents, who made up 18%. Additionally, 14% worked as employees by job order, and 15% were contractual. Temporarily employed respondents totaled 44%, while the remaining 3% were casual employees. This implies that most of the graduates are employed. Being employed in a stable job contributes to higher overall life satisfaction and psychological well-being (Warr, 2010), while unemployment can lead to social unrest and increased inequality within society (ILO, 2020).

Reasons for Unemployment

The researchers gathered significant data, as shown in Table 3, to better understand the graduates' unemployment status.

Table 3. Descriptive statistics of the reasons for unemployment status

Reasons for Unemployment	Frequency	Percentage
Do not look for a job	1	1
Family concerns	5	5
Health-related reasons	0	0
No job opportunity	0	0
Lack of work experience	0	0
Advance for further studies	1	1
Employed	79	79
Still in the ranking process	7	7
Preparing for the board exam	7	7

Of the 100 respondents surveyed, 7% were unemployed because they were preparing for the board exam. Another 7% were still in the ranking process, and 5% were due to family concerns. Some graduates did not look for a job, while 1% pursued further studies. This implies that the unemployment of the graduates was due to personal reasons. Research has shown that unemployment is linked to decreased social participation and an increased risk of social exclusion (Ziersch et al., 2014). Furthermore, there is a correlation between unemployment and poor mental health outcomes (Paul & Moser, 2009).

Type of Organizational Affiliation

Table 4 illustrates the types of organizations where BSSED-MATH graduates are employed.

Table 4. Descriptive statistics of the type of organizational affiliation

Type of Organization	Frequency	Percentage
Public	47	47
Private	34	34
NGO	1	1
None	18	18

It shows that 47% of the respondents currently work in public or government organizations, 34% are working for private organizations, and 18% are not working in any of the mentioned organizations. Additionally, 1% of the respondents work for NGOs (Non-Governmental Organizations). This implies that most respondents are employed in government or private organizations. Non-profit organizations are entities formed for a specific purpose and function without generating a profit (Herman and Renz, 2017). On the other hand, government

organizations are established by the state and funded by taxpayers to provide essential services to citizens (Shafritz et al., 2011).

Field of Work

As seen in Table 5, most of the respondents are teachers, accounting for 42%. This is followed by 17% working in BPO industries and 13% not working in any field. Out of 100 respondents, 7% are employed in the Local Government Unit (LGU), 3% in finance, and 2% as virtual assistants. Additionally, 2% work as assistant clerks or in clerical positions. Furthermore, 1% of the respondents work in construction, the Department of Labor and Employment (DOLE), artificial intelligence, real estate, video editing, and the Philippine National Police (PNP). It is implied that the graduates of BSED-Mathematics from Negros Oriental State University-Guihulngan Campus from 2017-2022 predominantly work in the field of teaching. "Teaching is a noble profession that requires a strong commitment to serving others and contributing to the betterment of society" (Acheampong et al., 2017). This explains why most respondents are teachers, as teaching is rewarding and challenging (Aquino & Punongbayan, 2015).

Table 5. Descriptive statistics of the field of work

Field of Work	Frequency	Percentage
Teaching	44	44
Business sector	5	5
Clerical	2	2
BPO	15	15
Construction	1	1
Virtual Assistant	2	2
Department of Labor and Employment -(GIP)	1	1
Video Editing	1	1
Assistant Clerk	2	2
LGU (Local Government Unit)	7	7
Artificial Intelligence	1	1
Real Estate	1	1
National Agency (Department of Justice)	1	1
PNP	1	1
Finance	3	3
None	13	13

Duration of Job Search

Table 6 shows when BSED-Mathematics graduates from 2017-2022 were looking for a job.

Table 6. Descriptive statistics of the duration of job search

Duration of Job Search	Frequency	Percentage
1 year and below	47	47
1 year - 2 years	15	15
2 years - 3 years	3	3
3 years - 4 years	5	5
4 years and above	6	6
None	24	24

It can be seen that the majority of the respondents were hired within a year or less, accounting for 47%. Respondents who did not look for a job totaled 24%. Some respondents did not look for a job because they were still preparing for the board exam and were in the ranking process. Additionally, 15% of respondents were hired within 1 to 2 years, 6% were hired within four years or more, and 5% were hired within 3 to 4 years. Moreover, 3% of the respondents were hired within 2 to 3 years. This implies that most graduates surveyed were hired within a year or more. Graduates may take longer to find employment, leading to long-term unemployment issues that could adversely affect their financial stability and mental well-being (Kassenboehmer & Sinning, 2014).

Number of Years in the Company

Table 7 shows that 37% have worked for 2-4 years. Respondents who have been working for one year or less total 24%, while 18% of the respondents are not employed. Additionally, 11% of respondents have been working for over one year, 7% for 5-7 years, and 3% for more than four years. This implies that the respondents surveyed have

been working for a significant time. Work experience and networking can significantly impact immediate employment for new graduates (Cooper & Brown, 2017).

Table 7. Descriptive statistics of the number of years in the company

Number of Years	Frequency	Percentage
1 year and below	24	24
1 year above	11	11
2 years - 4 years	37	37
5 years - 7 years	7	7
7 years and above	0	0
4 years and counting	3	3
None	18	18

Job Placement

Table 8 presents the job placement of the respondents. A total of 70% of BSED-Mathematics graduates worked in Negros Oriental as private and public school teachers, government employees (LGU), and business enthusiasts. Additionally, 10% worked in Cebu City as financial officers in BPO companies, assistant clerks, and construction workers. However, 16% of the respondents were not working and preferred staying in their hometowns. The remaining 4% of the total population was equally divided among Negros Occidental, Manila City, Iloilo City, and San Francisco, California.

Table 8. Descriptive statistics of the job placement

Job Placement	Frequency	Percentage
Negros Oriental	70	70
Negros Occidental	1	1
Cebu	10	10
Manila	1	1
Iloilo City	1	1
San Francisco, California	1	1
None	16	16

This implies that employed graduates were working in various locations, but most of them worked in Negros Oriental. "Workplace is increasingly being studied as a source of potentially meaningful experience." Rosso et al. (2010); Lysova et al. (2019).

Monthly Income

As seen in Table 9, most of the respondents' salaries range from 20,000 to 30,000, comprising 33% of the total. Respondents with salaries of 10,000-20,000 make up 23%, and 22% earn salaries of 10,000 and below. Furthermore, 2% of the surveyed respondents have salaries ranging from 40,000-50,000. Additionally, 1% preferred not to disclose their salary, and another 1% earned 50,000 or more. This implies that the average income of the graduates is 10,000 and above. "People who can derive meaning from their work enjoy many benefits, including enhanced motivation, productivity, and well-being". May et al. (2004; Steger et al. (2012). The desire to experience a sense of meaning in one's actions has been theorized as one of the primary sources of work motivation (Hackman, 1980); Barrick et al. (2013).

Table 9. Descriptive statistics of the monthly income

Monthly Income	Frequency	Percentage
10,000 and below	22	22
10,001-20,000	23	23
20,001-30,000	33	33
30,001-40,000	0	0
40,001-50,000	2	2
50,000 and above	1	1
None	18	18
Confidential	1	1

4.0 Conclusion

Based on the research findings, it can be concluded that most respondents aged 24-29 were female and employed, constituting 82% of the total sample. Among these respondents, 72% reported an average monthly salary of 10,000 PHP and above, sufficient to meet Filipino families' estimated poverty threshold. This suggests that higher-income individuals are more likely to secure stable employment opportunities. Furthermore, by providing opportunities for individuals to earn a monthly income of 10,000 PHP and above, government organizations and societies can help improve employment rates, contributing to overall economic growth and stability. The study concludes that a monthly income of 10,000 PHP and above significantly boosts employment opportunities and should be considered a crucial factor in addressing unemployment challenges and fostering economic prosperity. This implies that graduates of BSED Math majors should (1) enhance their skills in specializing in Mathematics and give them opportunities to be more innovative when it comes to students learning and teaching processes (2) focus on developing skills and knowledge pursuing graduate studies or undertaking preparations for the licensure examination, (3) not just depend on the lessons they have learned in college but also seek for further discoveries and information that is applicable in the chosen field of work, (4) the graduates may advance for further studies to have an edge, (5) take risks and apply for a position related to their profession to gain experience.

5.0 Contribution of Authors

The authors reviewed, wrote, and approved the final work.

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7.0 Conflict of Interest

There is no conflict of interest.

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