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Analysis on Work Status of Bachelor of Science in Biology Graduates for Curriculum Development: A Tracer Study

Asnar L. Aloro[1], Glaiza Calubiran[2], Maria Xenialyn Buloan[3], Julie Ann Bagasbas[4], Gaud Homer Gesmundo[5]

[1]College Instructor 3 - Laguna State Polytechnic University – San Pablo City Campus
San Pablo City Laguna, Philippines
[2,3,4,5] Faculty College of Arts and Sciences - Laguna State Polytechnic University – San Pablo City Campus
San Pablo City Laguna, Philippines
Email: [1]asnar.aloro@lspu.edu.ph | [2]glaiza.calubiran@lspu.edu.ph | [3]mariaxenialyn.buloan@lspu.edu.ph
[4]julieann.bagasbas@lspu.edu.ph | [5]gaudhomer.gesmundo@lspu.edu.ph

ABSTRACT:

The research aims to assess the employment status of Bachelor of Science in Biology graduates to guide the curriculum enhancement that can meet the industry demands. Using a tracer study approach, the data was gathered from graduates and ethical guidelines were strictly followed throughout the study. Thus, informed consent was obtained from the respondents and researchers ensured the confidentiality and anonymity of the data provided by the 31 participants from the BS Biology graduates who are employed. The results indicate that numerous graduates are working in sectors connected to the field of BS Biology. The research identifies important areas for enhancement in the curriculum, such as improved hands-on experience and cross-disciplinary classes. The graduates emphasized the significance of abilities like research, laboratory methods, and critical reasoning which are essential in their careers. The study reveals that most graduates from the BS in Biology program have successfully secured employment by heeding their feedback and most of them secure full-time positions. The majority of the respondents completed their studies in 2023, with over half of them were male, 90.32% were unmarried, some are still in school, and nearly half of the respondents earn between Php10,001 - Php20,000 monthly. Around half of them held professional, technical, or supervisory roles. In addition, most graduates believed that their degree programs had equipped them with the necessary knowledge and skills to succeed in their desired professions. Moreover, the current job of the participants is fairly satisfying for the survey respondents. Recommendations from the study involve incorporating additional practical learning opportunities, cultivating relationships with professionals in the field, and consistently revising the curriculum to keep pace with evolving scientific discoveries. Thus, this research offers valuable information for schools looking to improve their biology programs, thereby better preparing the students for future careers.

Keywords: *Bachelor of Science in Biology Graduates; Curriculum Development; Job Satisfaction; Tracer Study; Work status*

INTRODUCTION

The program relevance of a course offered by universities is one of the challenges that higher education needs to address. It is determined by how well the curriculum of the universities is aligned with the trends and needs of the global workforce. The tracer studies served as a mechanism to provide feedback regarding the program provided by an academic institution. It is also a method utilized by most organizations, particularly educational institutions, to track their graduates' progress and employment outcomes. Its goal is to assess a person's progress up until the moment he or she gets a job (Yusico, 2023). Additionally, tracer studies are documentary requirements of accrediting bodies in higher education, such as the Accrediting Agency of Chartered Colleges and Universities of the Philippines (AACCUP).

The Bachelor of Science in Biology is one of the majors offered by the College of Arts and Sciences, a constituent college of the university. Regulated by Commission on Higher Education (CHED) Memorandum No. 39, series of 2017, the undergraduate Biology program has been producing graduates for 14 years. With its strengthened and enhanced curriculum, the BS in Biology aims to continue producing graduates of higher quality.

Moreover, the Bachelor of Science in Biology students are usually provided with a fundamental understanding of biological sciences, laboratory methods, and analytical abilities. Nevertheless, a thorough understanding of graduates' employment outcomes is essential for a smooth transition from academic education to career success. This research is focused on tracing the employment status, professional journeys, and perceived preparedness of Biology graduates in various job settings. This study also examines the employment situation of Bachelor of Science in Biology graduates to offer relevant information for curriculum improvement through an extensive tracer study.

By examining the current work status of recent graduates, this study aims to identify strengths and areas for improvement in the existing curriculum. The knowledge from the alumni sheds light on the most important skills, competencies, and specialized knowledge in the work environment. The study's findings are essential for enhancing educational programs to better align with the industry requirements and improve the graduates' employability and success in their chosen careers.

Hence, this study contributes to the larger discourse on education quality and significance. It emphasizes the importance of utilizing data in decision-making for curriculum design which allows educational institutions to adjust to the evolving requirements of the biological sciences field. Ultimately, the goal of this tracer study is to offer valuable information for strategic improvements that will continually improve the educational experience and job prospects of BS Biology graduates.

OBJECTIVES

The primary objectives of this study are the following:

1. Determine the socioeconomic profile of the Bachelor of Science in Biology graduates.
2. Determine the overall employment rates and status of Bachelor of Science in Biology graduates within a specific timeframe of employment.

3. Identify and categorize the diverse career paths and related factors pursued by Bachelor of Science in Biology graduates.
4. Analyze the levels of job satisfaction among graduates currently employed in relevant fields.

METHODOLOGY

This study is focused on Bachelor of Science in Biology graduates who have completed their degree within one (1) to five (5) years specific time frame and utilized a longitudinal approach to track the graduates' career paths. A stratified sampling technique was utilized to ensure representation from various sectors, alumni databases, and professional networks that serve as sources to identify participants.

Furthermore, the researchers employed a descriptive-quantitative research design to gather comprehensive data. Quantitative survey research designs involve gathering numerous kinds of numerical data using a variety of techniques and aggregating the data through statistical analysis (Thomas and Zubkov, 2023). In addition, the study is descriptive in nature since it focused on the process of learning about the current circumstances to explain and interpret its goals. Hence, the survey gathered data on individuals based on their preferences, ideas, and behaviors through the use of interviews or questionnaires (Siedlecki, 2020).

The primary tool utilized to achieve the study's goal is the Graduate Tracer Study Questionnaire, which is in line with the tool utilized by the Philippine Commission on Higher Education (CHED). The questionnaire contains questions on socioeconomic profile, employment status, job roles, satisfaction levels, and perceived preparedness. Likert scale questions and open-ended responses were also utilized to gather detailed information. The survey questionnaire was validated and subjected to reliability testing with 0.94 (excellent) which indicates that response values for each participant across a set of questions are consistent. In addition, data were analyzed using statistical techniques such as descriptive statistics, correlation analysis, and analysis of variance to identify job satisfaction, correlations between variables, and predictors of successful career outcomes.

Ethical guidelines were strictly followed throughout the study. Thus, informed consent was obtained from the respondents and they were informed that their participation was voluntary. Furthermore, researchers ensured the confidentiality and anonymity of the data provided by participants.

RESULTS AND DISCUSSIONS

Table 1. Socioeconomic Profile of the Respondents

	Frequency	Percentage
Year of Graduation		
2018	4	12.90
2019	3	9.68
2022	11	35.48
2023	13	41.94

Sex		
Male	17	54.84
Female	14	45.16
Marital Status		
Single	28	90.32
Married	3	9.68
Educational Attainment		
Bachelor's Degree	29	93.55
Master's Unit Earner	2	6.45
Monthly Income		
10,000 Php and below	1	3.23
10,001 – 20,000 Php	15	48.39
20,001 – 30,000 Php	11	35.48
30,001 – above	4	12.90

Table 1 presents the socioeconomic profile of the respondents. Based on the results, it can be observed that most of the respondents graduated in 2023 (41.94%) and in 2022 (35.38%). This is attributed to the free tuition granted in the university which led to the increase of enrollees in BS Biology and the Commission of Higher Education (CHED) as one of its priority programs.

In terms of sex, more than half (54.84%) of the respondents were male while there 45.16% were female. This result contradicts the study of Hanson et al. (2020) which stated that sex disparity in the field of science may be rooted in gender role assignment and social belief where women are in the medical field and men are in the industrial sector.

It can be inferred from the results that the majority (90.32) of the respondents were single while only 9.68% were married. This further clarifies that have recently completed their degree. The result can be explained by the fact that the recent graduates are still engaged in college activities and maintain regular communication with both their teachers and classmates (Hipona et al., 2021; Cuadra et al., 2019).

Accordingly, the study revealed that only a few (6.45%) of the respondents are pursuing advanced studies. This suggests a need to encourage BS Biology graduates to pursue further education. To improve their chances of being hired permanently and/or promoted to higher positions in their respective fields locally as well as internationally, they must pursue graduate-level studies (Bacani et al., 2023).

Almost half (48. 39%) of the respondents have a monthly income ranging between Php10, 001 – Php20, 000. This implies that they receive a minimum wage of P385 to P520 for non-agriculture workers based on Wage Order No. IVA-20 dated Friday, September 8, makes the new daily minimum wages in

Region 4-A or CALABARZON covering the Southern Tagalog provinces of Cavite, Laguna, Batangas, Rizal, and Quezon.

Table 2. Respondent's Field of Training

	Frequency	Percentage
Clinical/Medical	6	19.35
Education/ Academe	3	9.68
Laboratory	18	58.06
Research	2	6.45
Industry	8	25.81
Others	4	12.90

Table 2 reveals that more than half (58.6%) of the respondents were deployed in the laboratory field related to their on-the-job training, 25.81% were deployed in industrial settings, 19.35% were in clinical/medical field; others underwent training in the academe, research industries and other fields. This indicates that on-the-job training facilitates the students with first-hand experiences in using tools, software, methods, or apparatus utilized in real-world settings. The on-the-job training is designed to equip the students with essential skills, as future employees are required to attain multiple skills to carry out tasks. Baert et al. (2021) explained that involvement in internships during higher education is positively correlated with favorable outcomes in the employment market following graduation. Thus, these students become more career-driven, hardworking, risk-averse, and competitive in their chosen field.

Table 3. Respondent's Nature of Occupation

	Frequency	Percentage
Clinical/Medical	3	9.68
Education/ Academe	2	6.45
Laboratory	18	58.06
Research	2	6.45
Industry	9	29.03
Others	5	16.13

Table 3 shows the respondent's nature of occupation, with more than half (58.06%) of the respondents engaged in laboratory work. It can be attributed to their on-the-job training experiences, where the majority were deployed in laboratory settings and were equipped with specific knowledge, skills, and capabilities relevant to their field. Graduates of biology programs on laboratory-based on-the-job training

were able to completely develop their process skills which led them to become competitive candidates for skilled and productive roles (Evangelista & Morales, 2015).

Table 4. Respondent's Job Level Position

	Frequency	Percentage
Rank-in-file or Clerical	9	29.03
Professional, Technical, Supervisory	13	41.93
Managerial, Executive	2	6.45
Self-employed	1	3.23
Others	6	19.35

Table 4 illustrates that almost half (41.93%) of the respondents were in professional, technical, and supervisory job-level positions. This explains that Biology graduates have entry-level jobs that call for in-depth expertise in a particular field, which they have obtained by completing bachelor's or advanced degree programs. Based on Republic Act No. 6758, Professional Supervisory (PS) Category includes responsible positions of a managerial character involving the exercise of management functions such as planning, organizing, directing, coordinating, controlling, and overseeing within delegated authority the activities of an organization, a unit thereof or of a group, requiring some degree of professional, technical or scientific knowledge and experience, and application of managerial or supervisory skills.

On the other hand, the findings are contrary to the study of Yusico (2023) which discovered that those with a Bachelor of Science in Biology from Surigao Del Sur State University are employed in clerical or rank-related positions.

Table 5. Respondent's Employment Status

	Frequency	Percentage
Regular/Permanent	26	83.87
Temporary	1	3.23
Casual	0	0
Contractual	2	6.45
Others	2	6.45

Table 5 demonstrates that the majority (83.87%) of the respondents held regular/permanent positions; while some graduates were also employed as contractual and temporary employees. This reflects that BS Biology graduates successfully find employment since they possess the abilities required for their roles. The results coincide with the study of Camuyong et al. (2023), who found that the majority of the graduates have permanent work. The findings of Cuadra et al. (2019) and Woya (2019) also reported similar results to the study, indicating high rates of permanent

employment among their respective graduates. Furthermore, Irene and Greif (2022) observed that some individuals have temporary, casual, and contractual job positions even if they graduated as scholars.

Table 6. Respondent's Career Prospect-Related Factors

School-Acquired Knowledge, Skills, and Competencies	Mean	Verbal Interpretation
Extent of Use and Relevance of Knowledge in Your Chosen Career	3.81	Highly Relevant
Extent of Use and Relevance of Skills in Your Chosen Career	3.87	Highly Relevant
Extent of Use and Relevance of Competencies in Your Chosen Career	4.00	Highly Relevant
Overall Mean	**3.89**	**Highly Relevant**

Legend: 4.21 – 5.00 Very Relevant; 3.41 – 4.20 Highly Relevant; 2.61 – 3.40 Moderately Relevant; 1.81 – 2.60 Fairly Relevant; 1.00 – 1.80 Poorly Relevant

Table 6 indicates that the school-acquired knowledge, skills, and competencies are highly relevant in their chosen career. This result merely indicates that the majority of graduates believed that their degree programs equipped them with the essential knowledge and abilities needed to succeed in their respective fields of work, which likely contributes to their high employment rates. The results corroborate with the study of Cuadra et al. (2019) which concluded that college graduates' proficiencies and skills were highly applicable to their careers. Similarly, Camuyong et al. (2023) found that Bachelor of Science in Biology graduates had greater employment prospects because of their degree-specific skills and coursework. Mokhtar et al. (2022) asserted that an individual must have essential knowledge, skills, and capabilities to ensure employment, as well as an understanding of how to maximize those assets to secure employment and effectively market oneself. Bacani et al. (2023) further noted that the knowledge and skills they acquired during their bachelor's degree were relevant to their present jobs.

Table 7. Respondent's Job Satisfaction

	Mean	Verbal Interpretation
How satisfied are you with your current job?	4.13	Moderately Satisfied

Legend: *4.21 – 5.00 Very Satisfied; 3.41 – 4.20 Moderately Satisfied; 2.61 – 3.40 Satisfied; 1.81 – 2.60 Poorly Satisfied; 1.00 – 1.80 Unsatisfied*

Table 7 depicts that Biology graduates are moderately satisfied (M=4.13) with their current job. This result is relatively similar to the study of Reusia et al. (2020) which reported the job satisfaction of Magsaysay State University graduates. This suggests that the majority of them are satisfied with the careers they have chosen. The internship of Biology Graduates has been positively correlated with favorable labor market outcomes, including employment possibilities, salaries, job satisfaction, and job status (Margaryan et al., 2020).

Table 8. Career Prospect- Related Factors

	Job Satisfaction	N	Mean	SD	SE
Career Prospect-Related Factors	Poorly Satisfied	2	1.83	0.24	0.17
	Satisfied	4	3.50	1.00	0.50
	Moderately Satisfied	13	3.79	0.71	0.20
	Very Satisfied	12	4.47	0.50	0.15

Table 8 presents that most of the graduates recognized that their degree programs provided them with the necessary knowledge and skills for them to be useful in their respective jobs. Macatangay (2013) revealed that curriculum and quality of instruction in both general education and major subjects are relevant to graduates' employability. This study also highlights that the quality of instruction, mastery of the subject matter being taught, and relating the subjects to other fields and other life situations were the top three very crucial factors to employment. This is also supported by Lijueraj et al. (2019) stating that the degree programs that students pursue help to improve their skills and employment status.

Table 9. Analysis of Levels of Job Satisfaction among BS Biology Graduates

ANOVA

	Sum of Squares	**df**	**F**	**p**
Job Satisfaction	13.3	3	9.99	< .01

Table 9 shows that there is a significant difference in the levels of job satisfaction among BS Biology graduates who are currently employed in relevant fields.

Table 10. Post Hoc Comparison of the Level of Job Satisfaction among BS Biology

Post Hoc Comparisons							
Comparison							
Job Satisfaction		**Job Satisfaction**	**Mean Difference**	**SE**	**df**	**t**	**p**
Poorly Satisfied	-	Satisfied	-1.67	0.58	27.0	-2.89	0.01
Poorly Satisfied	-	Moderate Satisfied	-1.96	0.51	27.0	-3.88	< .01
Poorly Satisfied	-	Very Satisfied	-2.64	0.51	27.0	-5.20	< .01
Satisfied	-	Moderate Satisfied	-0.30	0.38	27.0	-0.78	0.45
Satisfied	-	Very Satisfied	-0.97	0.38	27.0	-2.53	0.02
Moderately Satisfied	-	Very Satisfied	-0.68	0.27	27.0	-2.54	0.02

Table 10 indicates that the levels of job satisfaction namely "very satisfied", "moderately satisfied", and "satisfied" are greater compared to "poorly satisfied" in the career prospect-related factors such as knowledge, skills, and competencies among BS Biology graduates currently employed in relevant fields.

Likewise, the level of job satisfaction namely "very satisfied" is greater than compared to "satisfied" in the career prospect-related factors such as knowledge, skills, and competencies among BS Biology graduates currently employed in relevant fields. Lastly, the level of job satisfaction namely "very satisfied" is greater than compared to "moderately satisfied" in the career prospect-related factors such as knowledge, skills, and competencies among BS Biology graduates currently employed in relevant fields.

Conclusions

Based on the findings of the study, the following conclusions were drawn:

1. Most of the respondents who graduated in 2023 were male. An overwhelming majority (90.32) of the respondents were single, only a few are pursuing advanced studies and almost half have a monthly income ranging between Php10, 001 – Php20, 000.

2. The graduates of BS in Biology program are employable, meaning they can easily get a job, as evidenced by their responses. In addition, the majority of the respondents have permanent employment status.

3. Almost half of the respondents were in professional, technical, and supervisory job-level positions. The majority of graduates believed that their degree programs provided them with the knowledge and skills needed to be successful in their respective fields of work.

4. The respondents are moderately satisfied with their current job.

Recommendations

After gathering and giving conclusions, the following recommendations were proposed to improve the study:

1. To address the low percentage of those who pursued advanced studies, the College of Arts and Sciences may create plans to encourage them to enroll in post-graduate programs. This may potentially increase their earnings above the minimum wage but also strengthen their job security.
2. Work skills training can be introduced to the BS Biology graduates to provide them a good start for their career or provide them with more marketable skills and capabilities.
3. Graduate Tracer study can be conducted regularly to determine graduates' locations, assess current programs, evaluate the existing curriculum, and come up with relevant initiatives.
4. The College of Arts and Sciences may develop a more efficient method to track all the graduates and stay updated on their work status and conditions.

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