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Institutional Employability Analytics Through a Cross-Platform Graduate Tracer System

A Descriptive-Developmental Study Using Graduate Employment Data

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Abstract: This study developed and evaluated a cross-platform Graduate Tracer System designed to support institutional employability monitoring and data-driven decision-making. Anchored on a descriptive-developmental design, the study utilized graduate profile and employment records from Bachelor of Science in Computer Science and Bachelor of Science in Civil Engineering graduates across campuses of North Eastern Mindanao State University from academic years 2019 to 2022. The system consolidated graduate information, current employment status, job classification, and analytic reports into a mobile-responsive repository. System quality was evaluated using software quality parameters aligned with ISO/IEC 25010. Results show that the institutional graduate data set reached 600 graduates, with 276 valid responses. Employment outcomes varied across campuses and programs, with generally favorable employment indicators but observable differences in permanent, contractual, self-employed, and temporary work arrangements. The system obtained an overall weighted mean of 4.16, interpreted as very good, with performance efficiency rated excellent. The findings indicate that a cross-platform tracer system can reduce fragmented graduate monitoring, support timely reporting, and provide actionable evidence for curriculum review, career services, and industry linkage planning.

Keywords: *Graduate Tracer System; Employability Analytics; Data-Driven Decision-Making; Cross-Platform Application; ISO/IEC 25010.*

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I. INTRODUCTION

Graduate tracer studies are institutional mechanisms for documenting the transition of graduates from academic preparation to employment. They generate evidence on employment status, job placement, skill utilization, and the relevance of curricular preparation to labor market demands. In higher education, these data are increasingly important because they help institutions move beyond anecdotal alumni updates and toward systematic program evaluation, quality assurance, and decision support.

Despite the value of tracer studies, many institutions continue to depend on manual spreadsheets, disconnected forms, and periodic social media-based follow-ups. These approaches often result in delayed reporting, inconsistent data formats, low response visibility, and difficulty comparing employability outcomes across campuses or programs. When graduate employment information is fragmented, administrators may find it difficult to identify which programs require curriculum review, stronger career placement support, or improved industry partnerships.

The institutional context of this study is a multi-campus university where graduate information must be collected from geographically distributed campuses and academic programs. The terminal project data showed that the study covered Bachelor of Science in Computer Science and Bachelor of Science in Civil Engineering graduates from academic years 2019 to 2022 and produced 276 valid responses from 600 graduates. This volume of records requires a platform that can store, filter, analyze, and report graduate employment data in a timely and usable manner.

This research therefore presents the development and evaluation of a cross-platform Graduate Tracer System for data-driven employability analytics. The system is designed to consolidate graduate profiles, employment status, job classification, and analytic outputs. The study also evaluates the system using software quality parameters and interprets the employment patterns generated from the institutional data set.

- *Objectives of the Study*

The study aimed to develop and evaluate a cross-platform Graduate Tracer System that supports institutional employability monitoring and decision-making. Specifically,

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it sought to: (1) design a mobile-responsive repository for graduate and employment information; (2) develop analytic features for filtering, summarizing, and reporting graduate employment outcomes; (3) determine the employability profile of graduates by campus, program, school year, and job classification; and (4) evaluate the developed system based on selected ISO/IEC 25010 software quality characteristics.

II. REVIEW OF RELATED LITERATURE

Graduate tracer studies provide institutions with evidence on the relationship between academic preparation and employment outcomes. The Philippine Graduate Tracer Study explains that graduate tracer surveys collect information on college experience, skills learned, quality of instruction, and labor market outcomes, thereby helping the higher education sector formulate actions based on evidence [1]. International tracer study guidance likewise emphasizes that graduate surveys can inform education and training improvement by identifying transition-to-work patterns and the relevance of training to careers [2].

Technology-supported tracer systems can improve the efficiency of alumni tracking by enabling online data collection, automated filtering, and faster reporting. Ponte developed an online graduate tracer with a mobile application that allowed users to search job opportunities and support evaluation of alumni performance [3]. Similar web-based alumni tracer systems have been described as tools for monitoring employment status, whereabouts, and the relevance of skills and training acquired from the university.

System quality evaluation is also necessary because a tracer platform must be reliable, usable, secure, and efficient if it is to be adopted by graduates and institutional users. ISO/IEC 25010 defines quality characteristics and subcharacteristics that provide consistent terminology for specifying, measuring, and evaluating software product quality [4]. In this study, the system evaluation focused on performance efficiency, functional suitability, compatibility, usability, reliability, and security.

III. METHODOLOGY

The study employed a descriptive-developmental research design. The developmental component covered the planning, design, coding, testing, deployment, and refinement of the cross-platform Graduate Tracer System. The descriptive component summarized graduate profile and employment data collected through the system and interpreted the system evaluation results using weighted means.

The respondents were graduates of Bachelor of Science in Computer Science and Bachelor of Science in Civil Engineering from selected campuses of North Eastern Mindanao State University covering academic years 2019 to 2022. Based on the institutional terminal data, the population consisted of 600 graduates, of whom 276 submitted valid responses, resulting in an overall response rate of 46 percent.

The system followed an input-process-output logic. Inputs included graduate information, employer data, stakeholder requirements, and employment classifications. Processes included data collection, content-based filtering, data cleaning, analytics, report generation, and application development. Outputs included a mobile-responsive Graduate Tracer System and analytic reports for decision support.

System quality was evaluated using a five-point Likert scale where 1.00-1.80 was interpreted as poor, 1.81-2.60 as fair, 2.61-3.40 as satisfactory, 3.41-4.20 as very good, and 4.21-5.00 as excellent. Weighted means were computed for each quality parameter and interpreted according to the scale.

➢ *Conceptual Framework*

Fig. 1 shows the input-process-output framework used in the study. The feedback loop indicates that user and stakeholder observations were considered in refining the system and analytic outputs.

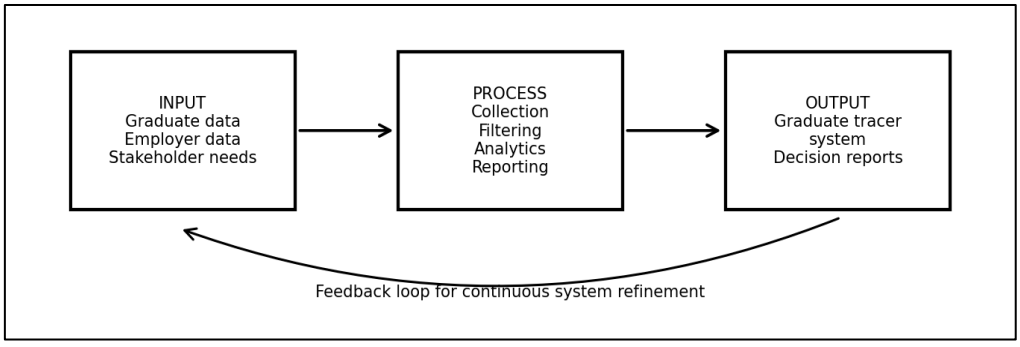

Fig 1 Input-Process-Output Framework of the Graduate Tracer System

IV. RESULTS AND DISCUSSION

➢ *Respondent Distribution*

The study generated 276 valid responses from 600 graduates, equivalent to a 46 percent response rate. The largest response group came from the Bachelor of Science in Computer Science program at the Tandag Campus, which contributed 146 responses. The Bachelor of Science in Civil Engineering program at the same campus contributed 23 responses. Additional responses came from the Computer Science programs in Tagbina, Lianga, and Cantilan campuses. This distribution demonstrates the value of a cross-platform approach because the target graduates were distributed across campuses and years of graduation.

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Table 1 Respondent Coverage by Campus and Program

Campus	Program	Graduates	Responses	Response %
Tandag	BSCS	261	146	52.85
Tandag	BSCE	88	23	26.14
Tagbina	BSCS	47	24	48.93
Lianga	BSCS	84	34	40.50
Cantilan	BSCS	120	49	40.83
Total		600	276	46.00

Table 1 shows that the overall data set covered 600 graduates, with 276 valid responses. Tandag BSCS contributed the largest number of responses, while the other campuses provided important comparative records for disaggregated employability reporting.

➢ *Employment Outcomes*

Employment outcomes varied by campus and program. The Civil Engineering graduates from Tandag Campus showed the highest employment rate among the reported program groups, followed by Computer Science graduates from Tagbina Campus. The data also showed that employment was not limited to regular or permanent positions. Contractual, casual, self-employed, temporary, and project-based engagements appeared in the graduate records, indicating that employability should be interpreted not only by employment rate but also by employment stability and job type.

These findings suggest that graduate tracer systems should include disaggregated reporting features. A single overall employment rate may conceal differences among campuses, programs, and employment classifications. For administrators, these differences can guide targeted interventions such as career coaching, internship strengthening, alumni networking, and employer partnership development.

Table 2 Employment Status by Campus and Program

Campus	Program	n	Employed	Emp.%	Unemp.	Unemp. %	Never	Never %
Tandag	BSCS	146	108	73.97	24	16.55	14	9.58
Tandag	BSCE	23	22	95.65	1	4.35	0	0.00
Tagbina	BSCS	24	24	100.00	0	0.00	0	0.00
Lianga	BSCS	34	27	79.41	5	14.70	2	5.88
Cantilan	BSCS	49	35	71.42	11	22.44	3	6.12

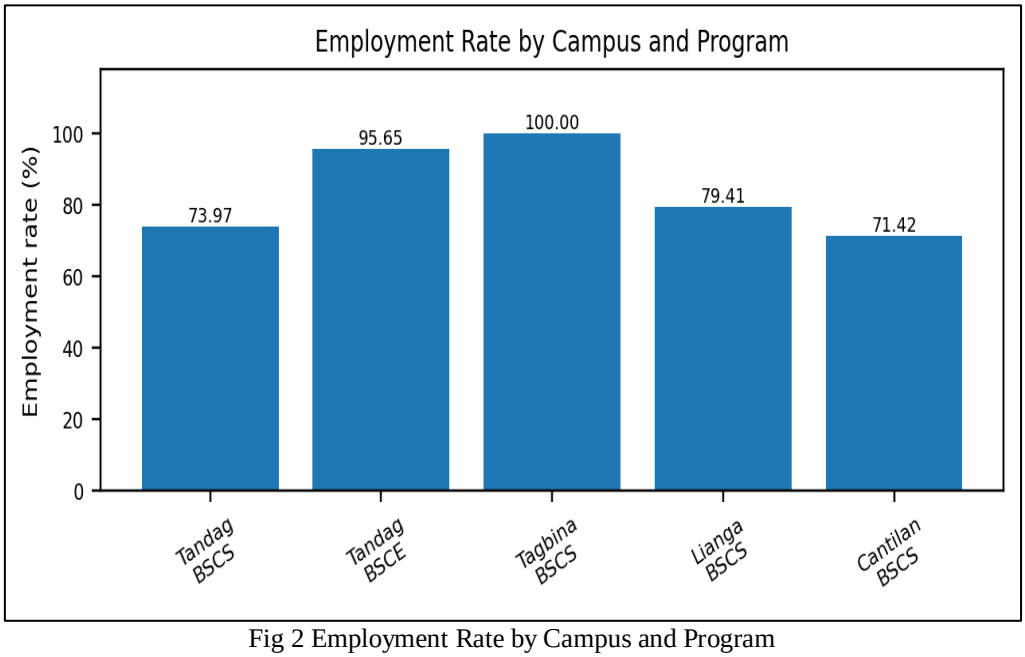

Fig 2 Employment Rate by Campus and Program

Table 3 Present Employment Classification of Graduates

Group	Regular	%	Casual	%	Contract	%	Self	%	Temp.	%	Project	%
Tandag BSCS	46	42.59	12	11.11	28	25.92	10	9.25	8	7.40	4	3.70
Tandag BSCE	11	47.82	1	4.34	8	34.78	0	0.00	1	4.34	1	4.34
Tagbina BSCS	9	37.50	1	4.16	12	50.00	2	8.33	0	0.00	0	0.00
Lianga BSCS	9	33.33	4	14.81	8	29.62	4	14.81	3	11.11	1	3.70
Cantilan BSCS	20	51.28	3	7.69	10	25.64	1	2.56	4	10.25	1	2.56

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Tables 2 and 3 show that employment outcomes should be read with attention to employment quality. Although most graduates were employed, the distribution of regular, contractual, self-employed, temporary, and project-based work varied across groups.

➢ *System Quality Evaluation*

The system quality evaluation yielded an overall weighted mean of 4.16, interpreted as very good. Performance efficiency obtained the highest rating with a weighted mean of 4.24, interpreted as excellent. This indicates that the system was perceived to respond within acceptable time, utilize resources efficiently, and perform within expected capacity. Usability obtained a weighted mean of 4.20, showing that respondents considered the platform understandable, learnable, operable, and accessible.

Functional suitability, compatibility, reliability, and security were all interpreted as very good. These results suggest that the system was able to provide the functions needed for graduate tracking and reporting, operate with other information contexts, remain dependable, and protect information under normal use conditions. However, the ratings also imply room for future enhancement, particularly in sustained interoperability, deeper analytics, automated alerts, and data privacy documentation.

Table 4 Five-Point Likert Scale Interpretation

Scale	Range	Interpretation
5	4.21-5.00	Excellent
4	3.41-4.20	Very Good
3	2.61-3.40	Satisfactory
2	1.81-2.60	Fair
1	1.00-1.80	Poor

Table 5 Overall Software Quality Evaluation

Parameter	Weighted Mean	Adjectival Rating
Performance Efficiency	4.24	Excellent
Functional Suitability	4.15	Very Good
System Compatibility	4.13	Very Good
System Usability	4.20	Very Good
System Reliability	4.17	Very Good
System Security	4.19	Very Good
Overall Weighted Mean	4.16	Very Good

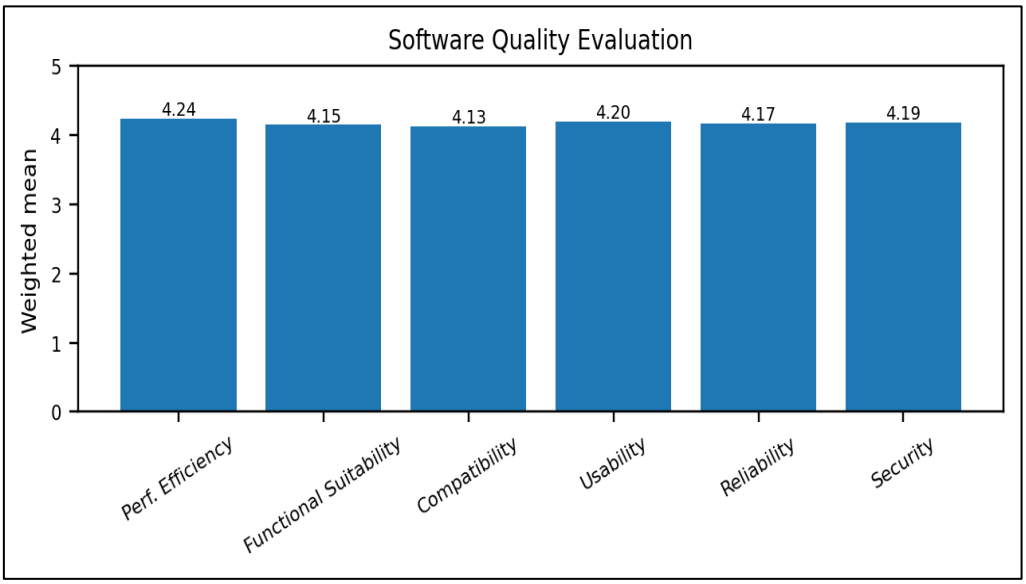

Fig 3 Weighted Mean Scores of Software Quality Parameters

➢ *Implications for Institutional Decision-Making*

The developed tracer system demonstrates how graduate employment records can be converted into decision-support information. Campus-level and program-level reports can support evidence-based curriculum review by showing whether graduates obtain stable employment, shift to contractual work, or pursue self-employment. These patterns can inform the design of career readiness activities, alumni mentoring, internship placement, and program advisory board consultations.

The system also supports accountability and quality assurance. By institutionalizing periodic graduate data collection, the university can maintain updated alumni

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information and produce employability evidence for accreditation, program review, strategic planning, and stakeholder reporting. The cross-platform nature of the system is particularly useful for multi-campus institutions because it reduces dependence on localized manual files and improves accessibility for graduates outside the main campus.

V. CONCLUSION

The study developed and evaluated a cross-platform Graduate Tracer System for institutional employability analytics. Findings show that the system can consolidate graduate and employment information, generate analytic reports, and support data-driven decision-making across campuses and programs. The graduate data revealed generally favorable employment outcomes, but also showed differences in employment stability and job classifications. These differences confirm the need for disaggregated tracer analytics rather than reliance on general employment rates alone.

The system obtained a very good overall quality rating, with performance efficiency rated excellent. This indicates that the platform is acceptable for institutional use while still allowing future improvements in interoperability, advanced analytics, automated notification, and long-term data governance. The study recommends the continued deployment of the system, regular updating of graduate records, integration with alumni and career services, and validation of analytics outputs with employers and program administrators.

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