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Charting Paths: A Graduate Tracer Study on the Employability of Engineering Graduates of the Polytechnic Institute of Tabaco

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ABSTRACT

This study examined the employability of engineering graduates from the Polytechnic Institute of Tabaco (PITA) covering graduates from 2005 to 2022 across three programs: Bachelor of Science in Electrical Engineering (BSEE), Bachelor of Science in Computer Engineering (BSCoE), and Bachelor of Science in Electronics Engineering (BSECE). Using a quantitative descriptive survey design, data were gathered from 137 out of 163 graduates (84.04% response rate) through an online questionnaire adopted from the Commission on Higher Education (CHED) Graduate Tracer Study instrument. The study established the demographic profiles of the respondents, determined their job placement profiles, and assessed the relevance of the curriculum and useful skills acquired during college. Results revealed that the majority of graduates were male (77%), single (71%), and aged 24–37 years. The BS in Electrical Engineering had the highest number of graduates and the highest employment rate (86.05%). A significant 83.94% of the graduates were currently employed, with 62.04% finding their first job related to engineering. Nearly half (48.91%) secured employment in less than a month. The majority of graduates (70.80%) found their college curriculum relevant to their first job. Communication and problem-solving skills were identified as the most useful competencies in both their first and current jobs. However, no graduates from BSECE passed the licensure examination, and 44% of BSEE graduates did not pass. The findings underscore the need for curriculum enhancement, strengthened board examination preparation, and continuous alignment of engineering programs with industry demands. This study serves as a baseline for future tracer studies and provides data-driven recommendations for institutional improvement.

Keywords: *graduate tracer study, employability, engineering graduates, curriculum relevance, job placement, higher education*

INTRODUCTION

Higher Education Institutions (HEIs) are called to nurture the development of competitive graduates who are not only equipped with the essential knowledge, skills, and values necessary to enrich their own lives but also to significantly contribute to the national labor market. HEIs need to prepare on how they can provide their students with the opportunity to advance their knowledge and skills in their profession. In other words, HEIs should serve as talent engines for innovation in promoting the development of competence (Abelha et al., 2020). The creation of skilled workers and the growth of the labor force are all examples of how higher education institutions contribute to economic prosperity (Patay, 2023).

ISSN: 3116-3475
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of Education, Research, and Innovation Perspectives
Volume 2 Issue 5 (May 2026)

According to Jones et al. (2021), the current transition has been generating global discourse over the responsibility of higher education institutions in cultivating graduates to contribute to the economic advancement of nations in the evolving knowledge-based economy. As the process of evolution persists, it is imperative to deliberate on strategies for augmenting the overall proficiency of the undergraduate students (Kay-Beason et al., 2020), encompassing both generic graduate capabilities and disciplinary specialization. To mitigate the influence of market forces resulting commercialization of education, deliberate choices can be made regarding the content of the curriculum used, related curricular activities, pedagogical approaches, and the design and utilization of learning environments (Haessler et al., 2022).

The Philippine labor market's situation from 2012 to 2019 showed an increase in the employment rate by 1.9 percentage points from 93.1% (37.6 million) to 94.9% (42.429 million) and the unemployment rate fell by 1.9 points from 7.1% (2,826,000) to 5.1% (2,263,000). Still, in 2020, the unemployment rate rose to 10.3% (4.5 million) which could be attributed to the pandemic's effect. Although, the government's commitment to recovery is evident in an increase in the workforce by 2021, the labor force increased by 8.7% or 3.823 million from 43.878 million in 2020 to 47.701 million in 2021. The employment rate significantly increased by 2.3% from 93.5% in November 2021 to 95.8% in November 2022. Meanwhile, reports suggested that as of October 2022, Region V had a 95.6% employment rate, and a 4.4% unemployment rate, yet with a significant 23.2% underemployment rate – the second among the highest underemployment rates in the country (DOLE, 2023).

The employability of graduates has become an issue that is not easy to ignore in the global economy (Cornillez, 2021). Higher Education is much more than just a production line for work-ready graduates; though there is no denying that people see higher education as a stepping stone to a good job (Palmiano, 2019). In the context of our interconnected and highly competitive knowledge-based economy characterized by constant change, the significance of employability is widely acknowledged by both policymakers and scholars (Nuccio & Mogno, 2023). Higher education institutions must equip students with the necessary skills and knowledge to effectively navigate future employment markets, adapt to emerging technology, and address unforeseen challenges.

Multiple studies have shown the many efforts of HEIs to increase the employability of their graduates; yet for them to be considered employable, they must possess the competencies and abilities that are adaptable to the changing labor market demands. Understanding the labor market needs and the factors impacting the employment outcomes of graduates is essential for Higher Education Institutions. Therefore, a tracer study serves as a critical monitoring tool for HEIs to track the employment status of their alumni, including their performance and efficiency in their roles and their ability to meet their employers' expectations. Moreover, HEIs' continuous revision of curricula and evaluation through Graduate Tracer Studies enables them to effectively respond to the evolving demands of current and prospective employers in society (Ramos & Flores, 2022).

The Polytechnic Institute of Tabaco (PITA) is an institution situated in the city of Tabaco committed to serving the educational needs of the people of the Bicol Region. Founded in 1985, the institution offers degree programs recognized and approved by the Commission on Higher Education, including Engineering Studies – particularly the Bachelor of Science in Electrical Engineering, Bachelor of Science in Computer Engineering and Bachelor of Science in Electronics Engineering. This tracer study was conducted pursuant to the Commission on Higher Education's mandate and to address the job market status of the graduates of PITA. There has been no Graduate Tracer Study (GTS) conducted in PITA since its first engineering graduates in 2008, creating a significant gap in understanding the career paths and employment outcomes of its graduates.

This study was anchored on the Human Capital Theory of Becker (1964), which argued that an individual's investment in education and training is analogous to a company's investment in new machinery or equipment. The end goal of education is to provide marketable skills and competencies that are essential to productivity in the workplace setting; thus, the more skilled and competent a worker is, the greater

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Volume 2 Issue 5 (May 2026)

number of job opportunities and possible higher income in the job market awaits them (Cornillez, 2021). Furthermore, the Labor Market Theory provides a framework for understanding how salaries are set and how workers are allocated to different jobs (McNabb, 1987).

Thus, this study aimed to determine the employability of the engineering graduates of Polytechnic Institute of Tabaco from 2005–2022. Specifically, the goals were to: (a) establish the demographic profile of the respondents; (b) determine the job placement profile of the respondents; and (c) determine the curriculum relevance and useful skills in the first job and current job.

METHODS

Research Design

This study utilized the quantitative approach using the descriptive survey. The responses from the respondents were gathered using an online questionnaire through Google Forms. The instruments were distributed among the graduates of the three Engineering Programs of Polytechnic Institute of Tabaco from AY 2005–2022. The research project used the survey method to track the graduates' profiles and the link between their college preparation towards their employment.

Research Locale

The study was conducted at the Polytechnic Institute of Tabaco (PITA), an institution situated in the city of Tabaco committed to serving the educational needs of the people of the Bicol Region and other neighboring areas by offering the benefits of formal education in tertiary levels. Founded in 1985, PITA is the pioneer and the sole school in the first district of Albay that offers engineering programs. The institution offers degree programs recognized and approved by the Commission on Higher Education.

Sampling Technique

The target respondents were comprised of 163 graduates of BS in Electrical Engineering, BS in Computer Engineering and BS in Electronics Engineering of Polytechnic Institute of Tabaco from AY 2005–2022. The sample initially targeted the entire graduates from 2005–2022; however, it generated a sample of 137 or 84.04% for the three programs with a total of 86 out of 107 for BS in Electrical Engineering, 25 out of 27 for BS in Computer Engineering, and 26 out of 29 for BS in Electronics Engineering. Despite the extensive efforts to reach and contact them, the missing respondents could not be located by the researcher, their previous classmates, or the institution. Despite not achieving complete enumeration, the response rate fell within the recommended range of 30 to 60 percent for graduate tracer studies, as outlined by Schomburg (2016).

Table 1. *Distribution of Respondents by Engineering Program*

Program	No. of Graduates	No. of Respondents	Response Rate (%)
BS in Electrical Engineering (BSEE)	107	86	80.37
BS in Computer Engineering (BSCoE)	27	25	92.59
BS in Electronics Engineering (BSECE)	29	26	89.66
TOTAL	163	137	84.04

Research Instrument

The study utilized the graduate tracer study questionnaire adopted from the Commission on Higher Education (CHED) Graduate Tracer Study Instrument. Some components were slightly modified to match the objectives of the study and were administered using Google Forms. The survey questionnaire was composed of three main parts: the first part included the demographic characteristics of the respondents; the second part contained questions regarding their employment status; and the third part surveyed the relevance of the curriculum and the skills learned in college that were useful in their employment.

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 5 (May 2026)

Data Gathering Procedure

The researcher initiated the study by seeking approval from the Dean of the College of Engineering and the School President. Upon receiving approval, a comprehensive list of graduates per course and year was obtained from the Registrar's Office. Contact was initiated through social media platforms and personal cellphone numbers. A group chat was established to enhance coordination throughout the study. Through individual outreach, a consent was secured from participants to complete the survey. Google Forms facilitated data collection by enabling real-time collaboration and efficient tabulation through its spreadsheet functionality.

Statistical Analysis

The acquired data were analyzed and interpreted using descriptive statistics and likewise frequency count and percentage were employed to analyze the respondent's profiles and employment characteristics. The results were presented in tables, with total responses for each variable tabulated to provide a clear overview of the findings. A separate column displaying percentages per engineering course was included for comparative analysis purposes.

Ethical Considerations

The researcher explained the purpose of the research upon communicating with the respondents. The identities and information provided were kept confidential, and informed consent was secured from each participant. Written consent to conduct the study was requested from the institution's administrator, with an assurance that the data collected shall only be used for this study.

RESULTS AND DISCUSSION

Demographic Profile of the Engineering Graduates

Table 2 shows the demographic profile of the respondents. The majority of the respondents' ages ranged between 24–30 years old and 31–37 years old, with a distribution of 47% and 45%, respectively. The majority of the Engineering Graduates were male, accounting for 106 out of 137 or 77%, while 23% or 31 out of 137 were female. As regards their status, the majority of the respondents (71%) were single, while 28% were already married.

Table 2. *Demographic Profile of the Respondents*

Variables	Frequency	Percentage (%)
Age Range		
24 – 30	64	47
31 – 37	61	45
38 – 44	10	7
45 – 58	2	1
Sex		
Male	106	77
Female	31	23
Civil Status		
Single	97	71
Married	39	28
Single Parent	1	1
Degree Program Taken		
BSCoE	25	18
BSEE	86	63
BSECE	26	19

ISSN: 3116-3475
International Journal
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Volume 2 Issue 5 (May 2026)

In terms of graduate distribution, the majority of the respondents graduated between 2011 to 2022. Among the three engineering programs, 86 out of 137 (63%) completed the course BSEE, BSCoE graduates account for 18%, while 19% were graduates of BSECE. The gender distribution among engineering graduates skewed towards males, indicating a gender imbalance typical in engineering fields.

Reasons for pursuing the degree

The top five reasons for pursuing engineering degrees included the influence of parents or relatives (29.93%), a strong passion for the profession (26.28%), availability of course offerings in the chosen institution (26.28%), opportunity for employment abroad (18.25%), and prospect for immediate employment (17.52%). Several studies supported that parents' advice influences students' career decisions (Labib et al., 2021), and the response on course availability was not unexpected given the limited availability of Engineering Programs within the First District of Albay.

Licensure examination results

Among the 86 Electrical Engineering graduates, only 48 or 56% successfully passed the professional examination. Among the passers, 29% became Registered Electrical Engineers, 16% passed dual registration as Registered Master Electricians and Electrical Engineers, and 11% were Registered as Master Electricians. On the contrary, 38 BSEE graduates or 44% did not pass the examination. However, none of the graduates in BSECE successfully passed the Licensure Examination for Electronics Engineer. Licensure examinations hold higher education institutions accountable for the quality of graduates' preparations (Bristol et al., 2023).

Job Placement Profile of the Engineering Graduates

Job after graduation

As shown in Table 3, there were 85 out of 137 or 62.04% of the presently employed graduates who responded that their first job was related to engineering, while 43 or 31.39% considered their first job not connected to the course they took in college. A majority of the employed graduates (48.91%) found their first job in less than a month and 17.52% of them within 1 to 6 months. This supports the studies of Palmiano (2019) and Sueno (2022), yet is contrary to the results in Pontillas (2018) which showed that it took the graduates longer than six months due to licensure examination preparation.

Table 3. *Job Placement Profile (Relation to Course, Length of Job Search, Length of Stay)*

Variables	Frequency (n=137)	Percentage (%)
Relation to the Course		
Related to the course	85	62.04
Not related to the course	43	31.39
Not applicable	9	6.57
Length of Job Search		
Less than a month	67	48.91
1 to 6 months	24	17.52
7 to 11 months	8	5.84
1 year to less than 2 years	12	8.76
2 years to less than 3 years	5	3.65
3 years to less than 4 years	8	5.84
Length of Stay in First Job		
1–6 months	27	19.71
7 to 11 months	17	12.41
1 year to less than 2 years	23	16.79
2 years to less than 3 years	15	10.95
3 years to less than 4 years	23	16.79
5 years and up	22	16.06

ISSN: 3116-3475
International Journal
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Volume 2 Issue 5 (May 2026)

Salaries and benefits (60.58%) were the foremost reason for accepting the job, followed by relation to special skills (37.96%) and career challenges (27.01%). As to the means of getting the job, 39.42% found their first job as walk-in applicants, followed by recommendations (34.31%), and information from friends (17.52%). The majority held professional, technical, or supervisory positions (40.15%), followed by rank or clerical positions (33.58%).

The majority of employed graduates (38.69%) earned between P10,000.00 and less than P15,000.00 per month. Another significant percentage (18.25%) earned between P15,000.00 and less than P20,000.00, while the smallest group of graduates earned P25,000.00 or more (8.03%). Notably, despite disparities in engineering expertise as fresh graduates, some already achieved a pay level ranging between P25,000.00 and above.

Career transition and present employment

Among the respondents, 69.34% indicated that their current employment is not their first job after college, while 23.36% are still in their first job. Currently, 10 graduates (7.30%) are not employed. Salaries and benefits were the top reasons for staying on the job (32.29%), followed by career challenges (26.04%). For changing jobs, salaries and benefits (26.99%) and career challenges (20.35%) were also the primary reasons.

The data regarding present employment showed that 83.94% of the graduates were currently employed, 13.87% were not employed, while 2.19% were never employed. BS in Electrical Engineering had the highest employment rate (86.05%), followed by BS in Computer Engineering (84%), while BS in Electronics Engineering had the lowest (76.92%). The majority were regular or permanent employees (52.55%), with 18.98% contractual and 11.68% self-employed. Among reasons for unemployment, family concerns were the primary factor (45.55%).

Table 4. *Nature of Employment and Reasons for Unemployment*

Variables	Frequency (n=137)	Percentage (%)
Nature of Employment		
Employed	115	83.94
Unemployed	19	13.87
Never been employed	3	2.19
Type of Employment		
Regular or Permanent	72	52.55
Contractual	26	18.98
Self-Employed	16	11.68
Other	11	8.03
Temporary	7	5.11
Casual	5	3.65

Local industries dominated the place of work (85.40%), with 8.03% employed abroad. Most graduates were employed in jobs aligned with their educational background, with 39.42% employed as engineers, 16.79% as general employees, and 11.68% in engineering-related fields. The majority of engineering graduates (27.01%) were working in construction firms, 18.25% in other lines of business, 13.14% in Electricity, Gas and Water Supply companies, and 10.95% in Manufacturing industries.

Curriculum Relevance and Useful Skills

Significantly, a majority of engineering graduates (70.80%) found their college curriculum relevant to their first job, while 23.36% answered it was not relevant. Similarly, 69.34% considered their college curriculum relevant to their current job. Positive responses were consistent across Computer Engineering (68%), Electrical Engineering (77.91%), and Electronics Engineering (42.31%) graduates. The implication of this result is important and advantageous for both the school and the graduates.

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 5 (May 2026)

Table 5. *Relevance of the College Curriculum*

Variables	BSCoE (n=25)	BSEE (n=86)	BSECE (n=26)	Total (n=137)	%
First Job – Yes	15 (60%)	66 (76.74%)	16 (61.54%)	97	70.80
First Job – No	10 (40%)	13 (15.12%)	9 (34.62%)	32	23.36
Current Job – Yes	17 (68%)	67 (77.91%)	11 (42.31%)	95	69.34
Current Job – No	6 (24%)	12 (13.95%)	11 (42.31%)	29	21.17

A curriculum that is perceived as relevant makes the graduate well-prepared, confident in their professional capabilities, and able to thrive in the evolving demands of the industry. This bears the same result conducted by Toquero and Ulanday (2021) wherein the study revealed that the supply of graduates' educational skills was highly matched with the skills demanded by the industry.

Skills useful in the first job and current job

Communication and problem-solving skills were identified as the most useful competencies learned in college for finding their first job, with 50.36% each. Human relations skills were considered third most useful by 31.39% of graduates, followed by information technology skills at 24.09%. Entrepreneurial skills were deemed least useful at 9.49%.

Table 6. *Skills Learned in College Useful in First Job and Current Job*

Skills	First Job f (n=137)	First Job %	Current Job f (n=137)	Current Job %
Communication Skills	69	50.36	70	51.09
Problem-Solving Skills	69	50.36	76	55.47
Human Relations Skills	43	31.39	54	39.42
IT Skills	33	24.09	42	30.66
Entrepreneurial Skills	13	9.49	19	13.87

In their current job, problem-solving skills were highlighted as very useful by 55.47% of respondents. Communication skills followed closely at 51.09%, with human relations skills at 39.42% and Information Technology skills at 30.66%. The consistency in perceptions among graduates from the three engineering programs highlights the universal importance of these skills in the industry (Magtaas et al., 2020). Various studies (Pontillas, 2018; Palmiano, 2019; Dawaton, 2021) confirmed that communication, human relations, leadership, problem-solving and research are important competencies in the graduate's employment.

It is worth noting that human relation skills ranked as the third most important skill, which could indicate a balance of both academic preparedness and a certain level of maturity and the importance of establishing good relationships with peers. This is something that could not be just taught but has been demonstrated to them and was likely acquired during their stay in the institution.

CONCLUSION

Based on the findings of this graduate tracer study, the following conclusions were drawn. The majority of engineering graduates from the Polytechnic Institute of Tabaco were predominantly male (77%), single (71%), and with an age range between 24 to 37 years old. There has been an increase in the number of engineering graduates in recent years, particularly concentrated between 2011 to 2022. Among the programs, BS in Electrical Engineering stood out with the highest number of graduates. Reasons for pursuing engineering degrees varied, with influences from parents or relatives, passion for the profession, and course availability being significant factors.

Regarding licensure examination performance, there has been a good number of board examination passers for BS in Electrical Engineering, accounting to 56%; however, there remains a significant 44% of non-passers for BSEE and zero passers for BS in Electronics Engineering. This is an area that requires immediate attention from the institution.

The data present valuable insights into the early career trajectories and salary levels of engineering graduates. The employment status distribution shows that a majority (83.94%) of the graduates are employed, with many working as engineers and in engineering-related fields among local industries. A significant 62.04% found their first job related to engineering, and nearly half (48.91%) secured employment in less than a month, indicating strong employability of the graduates.

The college curriculum was found to be very relevant in both the first and current jobs, with 70.80% and 69.34% affirming its relevance, respectively. Communication and problem-solving skills were identified as the most useful competencies in the workplace, consistently across all three engineering programs.

Based on these findings, the following recommendations are offered: (1) the institution should investigate factors affecting the declining enrollment in BSCoE and BSECE programs and consider offering additional engineering programs; (2) curriculum enhancement should include additional review and licensure examination-related subjects, along with institution-based comprehensive board examination preparation programs; (3) the institution should implement apprenticeship and entrepreneurship programs to facilitate the transition from academia to the workplace; and (4) regular tracer studies should be conducted across all programs to monitor employment trends and guide continuous improvement efforts.

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