

Employability tracer study of the Computer Engineering graduates from a private university in the Philippines

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Abstract: This study aimed to determine the Computer Engineering graduates' employability from a private higher education institution in the Philippines. The researcher uses a cross-sectional retrospective survey method. Twenty-seven out of 63 graduates (or 42.86%) Bachelor of Science in Computer Engineering (BSCpE) participated in the study from 2010 to 2017. The researcher used an electronic survey questionnaire patterned from the Commission on Higher Education (CHED) standard tracer study questionnaire as the data-gathering tool. Findings reveal that 85.19% are employed. 73.91% of the respondents preferred to seek their employment through direct company hiring, and 56.52% of them took one to six months to get a job. The majority (69.57%) declared that the Computer Engineering curriculum is relevant to their first job. The researchers recommended the annual review of the program curriculum and engagement with industry linkages for imperative and future insights. Furthermore, regular tracer study of the program graduates must be done.

Keywords: *computer engineering; tracer study; graduates; employability; statistics*

1. Introduction

The Philippines' unemployment rate reached 10.0 percent in July 2020 from an estimated 5.2% in January 2019. Unemployment was highest among people aged between 15 and 24, with a share of 38.1 percent. By highest educational attainment, a high percentage (27.9%) of unemployed persons were junior high school graduates, including high school graduates from the old curriculum, 24.8 percent were college graduates, and 6.2 percent were elementary graduates." (PSA, 2020).

The computer engineering labor markets in the Philippines and overseas have become competitive over the years. Firms prefer to hire graduates with employable skills relevant to their business and the industry standards (Lisá et al., 2019) and developed industry-desired competencies (Teijeiro et al., 2013). Employers expect graduates to bring something to boost their institutional objectives and growth. This fact pushed schools to train and produce graduates that meet the employers and industry requirements regardless of their industry specialization (Ismail & Mohammed, 2015).

Graduates need substantial training and education to thrive with the existing employment challenges either for job continuity or employment creation (Aránega, 2014). School curriculums must be competitive and consistent with the industry's employment demand and entrepreneurship creation (Martín, 2014). Curriculums taken by the graduates will be their basis of employability upon competing from the pool of limited job market, especially those not into entrepreneurship (Ahmad et al., 2012). Furthermore, schools need to regularly review their curriculum offerings and methods to strengthen graduates' employability and secure their skills' alignment with the industry.

After earning their university degree, graduates' employability status is an issue that cannot be ignored (Misra & Khurana, 2017). Tracer study is a tool that allows higher education institutions to determine their graduates' strengths and weaknesses and to accommodate societal changes through assessment and continuous review of their syllabus (Cañizares, 2015). Hence, this study is carry-out.

There are several tracer studies conducted relevant to the Computer Engineering program. Among these are the works of Albina and Sumagaysay (2020) and Balingbing (2014), which studied the employability of the Information Technology (BSIT) and Computer Science (BSCS) graduates of Negros Oriental State University and Camarines Sur Polytechnic Colleges. The paper of Mina et al. (2020) studied the high employability rate of the BSIT graduates of Nueva Ecija University of Science and Technology. Chavez et al. (2017) present the employability findings of the Electronics Engineering, Mechanical Engineering, and Industrial Engineering graduates of Lyceum of the Philippines University – Batangas from 2013 to 2015.

Like this paper, Aguila et al. (2016) and De Castro et al. (2017) present the Computer Engineering graduates' employability status of Lyceum of the Philippines University Batangas from 2013 to 2015 and 2015 to 2016 with high marking results. Standard variables used in their studies similar to this paper are the respondents' profiles like gender, highest educational attainment, and employability statuses.

This study aimed to determine the employability of the 2010 to 2017 Computer Engineering graduates of National University-Manila. Precisely, this study desired to address the following questions:

1. What are the respondents' gender and highest educational attainment information?
2. What is the respondents' employability in terms of the following:
 - a. Employment status and reasons if unemployed
 - b. Preferred means of seeking employment
 - c. Length of time for a job search

- d. First job after graduation and its present status
- e. Reasons for staying or leaving their first job
- f. Relevance of the *CpE* curriculum to their first job
- g. competency skills they find helpful in their first job

2. Method

2.1 Design

Conducted at the Computer Engineering department of the National University-Manila, this study used the cross-sectional retrospective survey method. National University is a private dynamic higher education institution that offers different tertiary programs, including Engineering programs in the main campus (Sampaloc, Manila) and extension campuses (Fairview, Quezon City; Baliwag, Bulacan; Dasmariñas, Cavite, and Laguna). The Computer Engineering department of the Engineering College solely manages the Computer Engineering program of the National University. It is a Level-II Re-accredited program by the Philippine Association of Colleges and Universities Commission on Accreditation (PACUCoA), effective until September 2023.

2.2 Research sample and sampling

The 63 Computer Engineering graduates of the National University are the target of this study by sending the survey questionnaire through their registered email address. The survey yielded a response rate of 42.86% or 27 respondents out of 63 graduates from the whole month of February 2020, as shown in Table I. The majority of the graduates are from 2011 (67%) and 2017 (60%) batches. The statistics considered in this study are solely from the returned surveys of the 27 graduates.

Table I. The number of *CpE* graduates (2010-2017) and respondents.

Graduation year	Total number of graduates (f)	Total number of respondents	
		f	%
2010	2	1	50.00
2011	3	2	66.67
2012	5	2	40.00
2013	7	1	14.29
2014	6	2	33.33
2015	8	3	37.50
2016	11	4	36.36
2017	20	12	60.00
Total	63	27	42.86

2.3 Tool

The researchers used Microsoft Forms as the data-gathering tool from the respondents. The survey questionnaire is fabricated from the standard Tracer Study Survey Questionnaire of the Commission on Higher Education (CHED) of the Philippines by both the Computer Engineering and Electronics Engineering department of the National University. The data generated from the respondents are organized, processed, and analyzed using Microsoft Excel and Insight. Moreover, the researchers use descriptive analytics to interpret the frequency and percentage distribution statistics.

3. Results and Discussion

Guided by the questions in section 2, this section discusses the respondents' information through descriptive analytics. Among the 27 respondents of this study, 62.96% (17 out of 27 respondents) are male, and 37.04% (10 out of 27 respondents) are female. Similar to the findings of Barker (2001), these numbers infer the growing interests of women in any Computer Engineering and ICT professions despite being underrepresented by men in the industry. Furthermore, no Computer Engineering graduate attempted to pursue graduate degrees after completing their bachelor's degree, as inferred from the statistics. Table 2 shows the respondents' gender and highest educational attainment statistics.

Table 2. Gender and educational attainment of the respondents.

Graduation Year	Total Respondents (f)	Gender (%)		Highest Education Attained (%)
		Male	Female	Bachelor
2010	1	100.00	0.00	100.00
2011	2	100.00	0.00	100.00
2012	2	100.00	0.00	100.00
2013	1	0.00	100.00	100.00
2014	2	50.00	50.00	100.00
2015	3	100.00	0.00	100.00
2016	4	25.00	75.00	100.00
2017	12	58.33	41.67	100.00
Total	27	62.96	37.04	100.00

Table 3 shows that 85.19% or 23 out of 27 Computer Engineering graduates from 2010 to 2017 are permanently employed. This employability percentage is 1.44% higher than the combined findings of the studies of De Castro et al. (2017) and Aguila et al. (2016). The studies of De Castro et al. (2017) and Aguila et al. (2016) covered the Computer Engineering graduates'

employability of Lyceum of the Philippines University-Batangas from 2013 to 2016. Moreover, these employability statistics imply that the Computer Engineering graduates of National University-Manila are employable and contribute to the national economic growth.

Table 3. (Un)Employed statistics of the respondents.

Graduation Year	Total Respondents (f)	Employed (%)	Unemployed (%)
2010	1	100.00	0.00
2011	2	100.00	0.00
2012	2	100.00	0.00
2013	1	100.00	0.00
2014	2	50.00	50.00
2015	3	66.67	33.33
2016	4	100.00	0.00
2017	12	83.33	16.67
Total	27	85.19	14.81

As revealed in Table 4, most of the 2010-2017 Computer Engineering graduates seek employment through direct company hiring (73.91% or 17 out of 23 employed respondents). 34.78% preferred applying through job sites, 30.44% for seeking through job fairs and agencies, and 26.09% for seeking employment through person-to-person contact. The other 13.04% preferred to either start or join their family business. These statistics support Tentama & Abdillah's (2019) conclusion that self-concept, other than the graduates' academic achievements, determines their employability as applicants or business owners. Self-concept subjectively affects the employability of graduates by how they professionally see themselves after earning their degree. While most respondents prefer to be employed through formal means, 13.04% prefer to seek employment by being self-employed or having professional contracts. Moreover, Table 5 shows the graduates' job search time through their preferred means, as gleamed in Table 4.

Table 4. Respondents' means of job search.

Graduation Year	Total Employed Respondents (f)	Direct Hiring (%)	Job Sites/ Ads (%)	Job Agency (%)	Personal Contact (%)	Other
2010	1	0.00	0.00	0.00	0.00	100.00
2011	2	0.00	50.00	0.00	100.00	0.00
2012	2	100.00	100.00	0.00	0.00	0.00
2013	1	100.00	0.00	0.00	100.00	0.00

Graduation Year	Total Employed Respondents (f)	Direct Hiring (%)	Job Sites/ Ads (%)	Job Agency (%)	Personal Contact (%)	Other
2014	1	100.00	100.00	100.00	0.00	100.00
2015	3	100.00	33.33	33.33	33.33	33.33
2016	4	100.00	50.00	25.00	25.00	0.00
2017	10	60.00	10.00	40.00	10.00	10.00
Total	23	73.91	34.78	30.43	26.09	13.04

Table 5. Respondents' job search time through Table 4 preferences.

Graduation Year	Total Employed Respondents (f)	Less than a month (%)	One to six months (%)	Seven months and more (%)
2010	1	0.00	100.00	0.00
2011	2	50.00	50.00	0.00
2012	2	50.00	50.00	0.00
2013	1	0.00	0.00	100.00
2014	1	0.00	100.00	0.00
2015	3	33.33	33.33	33.33
2016	4	25.00	50.00	25.00
2017	10	30.00	60.00	10.00
Total	23	30.43	56.52	17.39

As gleaned in Table 5, 56.52% (13 out of 23) of the employed graduates took one to six months for their employment acceptance. This statistic is similar to the finding of the studies of Chavez et al. (2017), De Castro et al. (2017), and Aguila et al. (2016), which are 50%, 45.76%, and 75%. These numbers also indicate that only a few graduates can find jobs less than a month. Moreover, Mason et al. (2009) suggested that graduates must have an exact positive and structured work experience in the labor market to find a job in one to six months.

As shown in Table 6, 69.57% (16 out of 23 respondents) employed graduates still are in their first job while the remaining 30.43% (7 out of 23 respondents) are now on their second or third job. Table 7 shows the preferences of 69.57% of respondents that stayed in their first job. On the contrary, Table 8 shows the remaining 30.43% of preferences that move to their new job.

Table 6. The number of respondents who stayed/left their first job.

Graduation Year	Total Employed Respondents (f)	Still in the first job (%)	Left their first job (%)
2010	1	100.00	0.00
2011	2	50.00	50.00
2012	2	0.00	100.00
2013	1	0.00	100.00
2014	1	0.00	100.00
2015	3	100.00	0.00
2016	4	100.00	0.00
2017	10	80.00	20.00
Total	23	69.57	30.43

As shown in Table 7, 56.25% (9 out of 16 employed graduates) of those who stayed in their first job are due to salaries, benefits, and career challenges. It can also infer that employed graduates retain their first job due to freedom in work schedule with a rate of 31.25% (5 out of 16 employed graduates) and its relevance in their computer engineering degree (37.5% or 6 out of 16 employed graduates). Other factors that made the employed graduates stay in their first job are personal growth (12.5%), international opportunity (25%), personal and corporate influences (18.75%), and the distance of work from home (6.25%). Similarly, the studies of Chavez et al. (2017), De Castro et al. (2017), and Aguila et al. (2016) showed that salaries and career challenges are the top two reasons why Computer Engineering graduates stayed in their first job.

In relevance to Table 7, Table 8 shows the factors that turned employed graduates to their first job for their following jobs. Four out of seven respondents, or 57.14%, prefer to tender their stay from their first job to their next job due to factors equivalent to salaries, benefits, and personal growth. Three of the seven respondents (42.86%) move to their new job due to their location. The other factors are career challenges (28.57%) and 14.29% for others. From these numbers, it can be inferred from tables 7 and 8 that salaries, benefits, and career growth are the main factors that affect the attrition behavior of Computer Engineering graduates from job to job, which is akin to the conclusion of the works of Bhardwaj & Singh (2017).

Table 7. Respondents' preferences for staying in their first job.

Total Employed Respondents (f)	Salaries/Benefits (%)	Career Challenge (%)	CpE Relevance (%)	Personal Growth (%)	Work Abroad (%)	Peer/Family Influence (%)	Corporate Relation (%)	Schedule (%)	Location (%)	Other (%)	Graduation Year
1	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	2010
1	100.00	100.00	100.00	0.00	100.00	0.00	100.00	100.00	0.00	0.00	2011
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2012
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2013
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2014
2	50.00	100.00	100.00	0.00	50.00	50.00	50.00	100.00	0.00	0.00	2015
4	75.00	75.00	25.00	0.00	25.00	25.00	0.00	0.00	0.00	0.00	2016
8	50.00	37.50	25.00	25.00	12.50	0.00	12.50	25.00	12.50	12.50	2017
16	56.25	56.25	37.50	12.50	25.00	18.75	18.75	31.25	6.25	6.25	Total

Table 8. Respondents' preferences for leaving their first job for a new job.

Total Employed Respondents (f)	Salaries/Benefits (%)	Career Challenge (%)	CpE Relevance (%)	Personal Growth (%)	Work Abroad (%)	Peer/Family Influence (%)	Corporate Relation (%)	Schedule (%)	Location (%)	Other (%)	Graduation Year
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2010
1	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2011
2	0.00	50.00	50.00	50.00	0.00	50.00	0.00	0.00	50.00	0.00	2012
1	100.00	100.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	100.00	2013
1	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2014
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2015
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2016
2	50.00	0.00	0.00	100.00	50.00	0.00	0.00	50.00	100.00	0.00	2017
7	57.14	28.57	14.29	57.14	14.29	14.29	0.00	14.29	42.86	14.29	Total

Table 9. Unemployment reasons of the unemployed respondent.

Graduation Year	Total Unemployed Respondents (f)	Work mismatch (%)	Health issues (%)	Zero opportunities (%)
2010	0	0.00	0.00	0.00
2011	0	0.00	0.00	0.00
2012	0	0.00	0.00	0.00
2013	0	0.00	0.00	0.00
2014	1	100.00	0.00	0.00
2015	1	100.00	0.00	100
2016	0	0.00	0.00	0.00
2017	2	100.00	50.00	50.00
Total	4	100.00	25.00	50.00

Table 10 shows the university's respondents' competencies and found them helpful in their first job. Graduates found communication skills as the most practical competency in their first job, with a rate of 82.61% (19 out of 23 employed graduates). This result is like the findings of Dotong et al. (2016), Chavez et al. (2017), De Castro et al. (2017), and Aguila et al. (2016) hence, cementing the fact that communication is a must-have skill in securing a job and expressing technical ideas in engineering.

Table 10. Competencies were found helpful by the respondents in their first job.

*TPR (f)	*Com (%)	*Ent (%)	*HR (%)	CpE Skills (%)	*PS & CT (%)	Graduation Year
1	100.00	100.00	100.00	0.00	0.00	2010
2	100.00	50.00	50.00	50.00	50.00	2011
2	100.00	100.00	100.00	50.00	50.00	2012
1	100.00	100.00	100.00	100.00	100.00	2013
1	0.00	100.00	0.00	0.00	0.00	2014
3	33.33	33.33	33.33	66.67	33.33	2015
4	100	75.00	100.00	100.00	50.00	2016
10	80	90.00	70.00	60.00	50.00	2017
23	82.61	82.61	73.91	65.22	47.83	Total

*TER- Total Employed Respondents; Com- Communication; Ent- Entrepreneurial; HR- Human relation; PS & CT-Problem-solving and Critical Thinking

Although the graduates are employed in several companies, they find entrepreneurial skills useful in their first job with 82.61%. This finding contradicts De Castro et al. (2017) and Aguila et al. (2016) that it is the least helpful competency for Engineering graduates as it has no direct application to their jobs. Entrepreneurial skill enhances an individual's critical thinking,

teamwork, empathy, and learning from mistakes towards employability and engineering business (Mosly, 2017).

Human-relation skills ranked third in the most helpful skill found by the graduates in their first job (73.91%- 17 out of 23 employed respondents). This statistic supports Roger (2019) that Engineers require human-relation skills as they take various forms of management, administrative, and team leadership tasks more than technical job orders. This finding is common to other engineering graduates as deemed by the studies of Dotong et al. (2016), Chavez et al. (2017), De Castro et al. (2017), and Aguila et al. (2016) from their samples.

Further, Computer Engineering skills (65.22%) and problem-solving and critical thinking skills (47.83%) are the other competencies found helpful by the graduates on their first job. Computer Engineering skills refer to the essential technical skills of the CpE graduates, including software, hardware, and network engineering, which are always part of every computing and electronics engineering job. The analyses of Pais-Montes et al. (2019) showed that obtaining Computer Engineering skills that involve problem-solving and critical thinking activities are required to be helpful in their employment.

Table II. Respondents' evaluation of CpE curriculum to their first job.

Graduation Year	Total Employed Respondents (f)	With relevance to the first job (%)	Without relevance to the first job (%)
2010	1	100.00	0.00
2011	2	50.00	50.00
2012	2	100.00	0.00
2013	1	0.00	100.00
2014	1	100.00	0.00
2015	3	66.67	33.33
2016	4	75.00	25.00
2017	10	66.67	33.33
Total	23	69.57	30.43

Table II demonstrates the graduates' evaluation regarding the relevance of the Computer Engineering curriculum they took over their first job. Most of the employed respondents (69.57% or 16 out of 23 employed graduates) declared that the Computer Engineering curriculum they took at the National University-Manila is relevant to their first job. This fact supports competitive graduates in the job market depending on their undertaken curriculum (Ahmad et al., 2012). By inferring through the statistics above and self-concept, the remaining 30.43% of the respondents took jobs that are irrelevant to the nature of Computer Engineering. Nevertheless, these

numbers indicate that the university's Computer Engineering curriculum is useful in training Computer Engineering professionals toward employability to the program's adjunct industries.

4. Conclusion and Recommendation

The insights generated from this study are significant for several bases. First, this study recognizes curriculum-related issues, the graduates' employability statuses, and unemployment reasons. Second, this study was able to identify that the competencies mentioned above are integrated-well with the curriculum of the program, from which the respondents adapted and used in their jobs. Third, the Computer Engineering curriculum of the National University is found useful for the graduates' employability. Lastly, this study might be used further to enhance the Computer Engineering curriculum and as a guide for pre-employment seminars and training for the future Computer Engineering graduates of the National University.

The researchers conclude that 23 out of 27 graduates of Bachelor of Science in Computer Engineering (BSCpE) from 2010 to 2017 of National University-Manila who served as this study's respondents are employable. The other four respondents are unemployable as BSCpE graduates due to their self-concept of employment and other personal factors like health and family matters. All employed graduates have permanent jobs and took an average of one to six months to land their first job. Furthermore, it is found that salaries, benefits, and career growth are the driving factors that determine the attrition behavior of the graduates from jobs to jobs

The researchers also conclude that the curriculum content of Computer Engineering is relevant to the graduates' first job. It is found that the curriculum produces CpE professionals that are effective with the program's adjunct industries. Finally, although all the six competencies are relevant in the graduates' jobs, communication and entrepreneurial skills are the most useful.

The following are the recommendations:

- a. The university management, together with alumni and industry partners, must conduct a periodical review and update of the Computer Engineering curriculum to ensure the program's marketability and employability and secure the relevance of the offered curriculum to the needs of the industry;
- b. Importantly, university management must engage partnerships with several industries adjunct to the Computer Engineering program. Its graduates will benefit most through employability and itself in return as their alma mater;

- c. Alternatively, university faculty of Computer Engineering courses must engage with industry immersions regularly to identify industry-desired training, practices, and competencies for the graduates to be highly employable;
- d. Due to the scarce of the volume of computer engineering tracer studies locally and from other universities, the management must conduct an annual Computer Engineering graduate tracer study with a broader scope of coverage in terms of previous years graduates for robust data and an addition to the volume of Computer Engineering tracer study.
- e. Lastly, future studies may include additional parameters like the graduates' specific profession/occupations in their graduate analysis. Also, future studies may use exploratory statistics as their analytical tool instead of traditional descriptive statistics. Exploratory allows a study to generate several insights from scarce data without subjective analysis.

References

- Aguila, G. M., de Castro, E. L., Dotong, C. I., & Laguador, J. M. (2016). Employability of computer Engineering graduates from 2013 to 2015 in one private higher education institution in the Philippines. *Asia Pacific Journal of Education, Arts and Sciences*, 3(3), 48–54.
- Ahmad, K., Zainal, N. F. A., Idris, S., & Rahmat, M. (2012). Relationship between Employability and Program Outcomes Achievement. *Procedia - Social and Behavioral Sciences*, 59, 254–263. <https://doi.org/10.1016/j.sbspro.2012.09.273>
- Albina, A. C., & Sumagaysay, L. P. (2020). Employability tracer study of Information Technology Education graduates from a state university in the Philippines. *Social Sciences & Humanities Open*, 2(1), 100055. <https://doi.org/10.1016/j.ssaho.2020.100055>
- Aránega, S. (2014). Competences for employability: How can they be developed and assessed in initial training? *Procedia - Social and Behavioral Sciences*, 139, 366–372. <https://doi.org/10.1016/j.sbspro.2014.08.015>
- Atkinson, H., & Pennington, M. (2012). Unemployment of engineering graduates: The key issues. *Engineering Education*, 7(2), 7–15. <https://doi.org/10.11120/ened.2012.07020007>
- Balingbing, A. B. (2014). *Asia Pacific Journal of Multidisciplinary Research*. 2(4).

- Barker, A. M. (2001). Effects of gender on engineering career commitment. *Journal of Women and Minorities in Science and Engineering*, 7(2), 28. <https://doi.org/10.1615/JWOMENMINORSCIENENG.V7.I2.40>
- Bhardwaj, S., & Singh, M. A. (2017). Factors affecting employee attrition among engineers and nonengineers in manufacturing industry.. <https://doi.org/10.14311/bit.2017.02.04>
- Cañizares, M. J. F. (2015). Tracing University of San Carlos' science and mathematics education graduates: How well are we in developing teacher professionals? *International Journal of Research Studies in Education*, 4(2). <https://doi.org/10.5861/ijrse.2015.985>
- Chavez, N. H., Camello, N. C., Dotong, C. I., Angelie, M., & Pamplona, I. (2017). Employability of Engineering Graduates from 2013 to 2015 as Basis for a Proposed Student Development Program. *Asia Pacific Journal of Multidisciplinary Research*, 5(1), 155–166.
- de Castro, E. L., Theresa, M., Prenda, B., & Dotong, C. I. (2017). Employability of Computer Engineering Graduates during Academic Year 2015-2016 and their Lifelong Learning Options. In *Asia Pacific Journal of Academic Research in Social Sciences* (Vol. 2).
- Dotong, C. I., Chavez, N. H., Camello, N. C., de Castro, E. L., Prenda, M. T. B., & Laguard, J. M. (2016). Tracer study of Engineering graduates of one higher education institution in the Philippines for academic year 2009-2021. *European Journal of Engineering and Technology*, 4(4). www.idpublications.org
- Ismail, S., & Mohammed, D. S. (2015). Employability skills in TVET curriculum in Nigeria Federal Universities of Technology. *Procedia - Social and Behavioral Sciences*, 204, 73–80. <https://doi.org/10.1016/j.sbspro.2015.08.111>
- Lisá, E., Hannelová, K., & Newman, D. (n.d.). Comparison between employers' and students' expectations in respect of employability skills of university graduates.
- Martín, R. D. (2014). The Importance of communication competency for employability. *Procedia - Social and Behavioral Sciences*, 139, 387–394. <https://doi.org/10.1016/j.sbspro.2014.08.024>
- Mason, G., Williams, G., & Cranmer, S. (2009). Employability skills initiatives in higher education: What effects do they have on graduate labour market outcomes? *Education Economics*, 17(1), 1–30. <https://doi.org/10.1080/09645290802028315>
- Mina, J. C., Reyes, E. J. G., & Salas, R. F. (2020). A Tracer study of Bachelor of Science in Information Technology (BSIT) graduates of Nueva Ecija University of Science and Technology (NEUST), San Isidro Campus. *International Journal of English Literature and Social Sciences*, 5(4), 1337–1344. <https://doi.org/10.22161/ijels.54.77>
- Misra, R. K., & Khurana, K. (2017). Employability skills among Information Technology professionals: A literature review. *Procedia Computer Science*, 122, 63–70. <https://doi.org/10.1016/j.procs.2017.11.342>

- Mosly, I. (2017). The significance of including an entrepreneurship course in Engineering programs. *Higher Education Studies*, 7(4), 9. <https://doi.org/10.5539/hes.v7n4p9>
- Pais-Montes, C., Freire-Seoane, M. J., & López-Bermúdez, B. (2019). Employability traits for engineers: A competencies-based approach. *Industry and Higher Education*, 33(5), 308–326. <https://doi.org/10.1177/0950422219854616>
- Philippine Statistics Authority (PSA) (2021, February 19). *Employment situation in July 2020*. <https://psa.gov.ph/content/employment-situation-july-2020-0>
- Roger, A. (2019). Which human skills are necessary for engineers? In *Skills Management* (pp. 47–65). John Wiley & Sons, Inc. <https://doi.org/10.1002/9781119579267.ch2>
- Teijeiro, M., Rungo, P., & Freire, M. J. (2013). Graduate competencies and employability: The impact of matching firms' needs and personal attainments. *Economics of Education Review*, 34, 286–295. <https://doi.org/10.1016/j.econedurev.2013.01.003>
- Tentama, F., & Abdillah, H. (2019). Student employability examined from academic achievement and self-concept. *International Journal of Evaluation and Research in Education (IJERE)*, 8(2), 243–248. <https://doi.org/10.11591/ijere.v8i2.18128>