



Employability tracer study of Information Technology Education graduates from a state university in the Philippines

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ABSTRACT

This study aimed to determine the employability of Information Technology Education graduates from a state university in the Philippines. The researchers employed cross-sectional retrospective survey method. One-hundred seventy-seven out of 204 (or 86.76%) graduates of Bachelor of Science in Information Technology and Bachelor of Science in Computer Science from year 2015–2017 participated in this study. The data gathering instrument used by the researchers is the Graduate Tracer Study developed by the Commission on Higher Education. Findings reveal that 78.53% (or 139 out of 177) of the respondents are already employed. Moreover, 69.78% (or 97 out of 139) perceived that their first job is related to the program that respondents took up in college. It took one year to less than two years for the 28.06% of the respondents to land in their first job. It is also noteworthy that it took 1–6 months for 25.90% of the respondents to find their first job. When asked whether or not the curriculum they had in college is relevant in their first job, majority of the respondents (69.78%) declared that the curriculum of the program they had in college is indeed relevant. To further enhance the marketability of BSIT and BSCS programs and the employability of the graduates they produce, among the researchers' recommendations is the periodic review of curriculum by academic leaders, alumni, and industry representatives to ensure that graduates are equipped with the necessary knowledge and skills required in the industry.

1. Introduction

The unemployment rate in the Philippines in January 2019 was estimated at 5.2%. “Of the total unemployed, the age group 15–24 years comprised 43.7%, while the age group 25 to 34, 30.6%. By educational attainment, 20.9% of the unemployed were college graduates, 8.2% were college undergraduates, and 28.2% have completed junior high school. Graduates of junior high school include those high school graduates in the old curriculum” (PSA, 2019).

The labor markets in the Philippines and abroad have become very competitive. When parents are confronted with the choice of Universities and Colleges where their children will attend and get a degree, the prospects for future employment carry much weight. Employability, thus, becomes a matter of crucial consideration when schools define their curriculum and their policies on recruitment, entrance, and retention.

“In the 21st century, employability skill is the most required skill besides technical knowledge in an attempt to compete for employment and sustain job at the industrial global market” (Ismail & Mohammed, 2015). Schools have to provide the training that meets the standards

employers set for their workforce. Industries may have different standards, but they always have a set of characteristics they expect for their applicants to possess that would boost institutional objectives. Whether employers seek graduates whose skills are, either, related or not aligned to their field of specialization, they will always look for their standards.

Initial education needs to be able to grant the necessary skills for any professional to be able to overcome the existing challenges, either to the search for a job with continuity or to the creation of their own employment through enterprising behavior (Aranega, 2014). Thus, the university curriculum should be consistent with the demands of employment and self-employment, especially at higher education levels (Martin, 2014). Moreover, “competitive graduates in the job market often depend on a strong curriculum of the programs. Graduates are competing among themselves to meet the job market in various sectors. Because of the limited amount of jobs available, many graduates end up unemployed” (Ahmad, Zainal, Idris, & Rahmat, 2012).

It is further argued that “individuals who have best developed the competencies which firms feel to be most important are more likely to be in a position to obtain a job” (Teijeiro, Rungo, & Freire, 2013). This

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requires for the educational process to go beyond the level of imparting knowledge and developing skills. It must be leveled up to ensuring and producing employable graduates. Thus, schools need to regularly review their programs, offerings, curricula, and methods to strengthen the employability of their graduates. Alignment and realignment of resources towards this end must become a priority.

“Employability of graduates therefore has become an issue that is not easy to be ignored in the global economy” (Misra & Khurana, 2017). Studies like this have become the main instruments to determine the areas of strength and weakness of an institution’s graduates. “Graduate tracer studies (GTS) are important to Higher Education Institutions since it enabled such institutions to accommodate changes in the society especially the demands of the actual and potential employers, through evaluation and constant review of their curricula” (Cañizares, 2015, p. 82). Hence, this present study is conducted.

Outside the Philippines, Woya (2019) and Siraye, Abebe, Melese, and Wale (2018) conducted employability tracer studies among statistics graduates, and business and economics graduates, respectively. In the Philippines, there are also several attempts to conduct employability tracer studies among graduates of B.S. in Industrial Technology (Del Rosario, 2019), Bachelor of Secondary Education (Cañizares, 2015; Navida, 2018), and Bachelor of Elementary Education (De Vera, 2018), to name a few. In fact, the studies of Del Rosario (2019) and Navida (2018) adapted the GTS questionnaire from the country’s Commission on Higher Education. However, the study of Navida (2018) has a very low participation rate with only 29 out of 130 (22.31%) graduates completed the questionnaire. Another local study which is noteworthy is that of Balingbing (2014) because the respondents of her study were also B.S. in Information Technology graduates which are similar to the respondents of this study but with inclusion of B.S. in Computer Science graduates.

Billo et al. (2017) also conducted an employability tracer study of B.S. in Information Technology (BSIT) and B.S. in Computer Science (BSCS) graduates of Batch 2014, 2015, and 2016. Two hundred twenty one out of 253 graduates participated in this study. They sought to determine the socio-demographic profile of graduates, the employability of graduates (in terms of employment status, present occupation, companies graduates are employed, reasons for staying in the job, reasons for accepting the job, length of time it took the graduates to land in the first job, gross monthly income), and the reasons for not having a job. In this present study, the researchers conducted an employability tracer study of BSIT and BSCS graduates (the same programs as the previous study) of Batch 2015, 2016, and 2017. The following variables were determined: the socio-demographic profile of graduates, employability of graduates (in terms of employment status, present occupation, companies graduates are employed, reasons for staying in the job, reasons for accepting the job, length of time it took the graduates to land in the first job, gross monthly income), and the reasons for not having a job.

Other variables used in this present study that were not included in the study of Billo et al. (2017) are the following: whether or not the curriculum the graduates had in college was relevant to their first job, and whether or not the competencies they learned in college were found useful by the graduates in their first job. Another gap that this present study addresses is the paucity of published employability tracer studies among B.S. Information Technology (BSIT) and B.S. Computer Science (BSCS) graduates in the Philippines.

2. Research questions

This study aimed to determine the employability of Information Technology Education graduates (BSIT and BSCS) of Negros Oriental State University, Bayawan-Sta. Catalina Campus from year 2015–2017. Specifically, this study sought to address the following questions:

1. What are the respondents’ personal characteristics in terms of sex and civil status?
2. What is the graduates’ status of employability in terms of:

- 2.1. whether or not they are employed,
- 2.2. whether or not the graduates’ first job is related to their program in college,
- 2.3. reasons why some respondents are not yet employed,
- 2.4. respondents’ employability status,
- 2.5. gross monthly earning in respondents’ first job,
- 2.6. length of time it took the respondents them to land in their first job,
- 2.7. whether or not the curriculum in college is relevant in their first job, and
- 2.8. the competencies learned in college that respondents find useful in their job?

3. Research methods

3.1. Design

This study utilized the cross-sectional retrospective survey method. This research was conducted at Negros Oriental State University (NOrSU) Bayawan – Sta. Catalina Campus (BSC), Information Technology Department and Computer Science Department (ITD & CSD) located in the boundary of Bayawan City and Municipality of Sta. Catalina, province of Negros Oriental, Philippines. NOrSU is the only state-owned university in the province; it has campuses located across the province. One of its campuses is Bayawan – Sta. Catalina Campus. ITD and CSD are departments under the College of Arts and Sciences (CAS), and are Level II Re-accredited by the Accrediting Agency of Chartered Colleges and Universities in the Philippines (AACCUP) effective until September 2022.

3.2. Research sample and sampling

There were 204 BSIT and BSCS graduates who graduated from 2015 to 2017. All of them were targeted to be given survey questionnaires. The survey yielded a response rate of 86.76% or 177 out of 204 targeted respondents (see Table 1). Some of the graduates were working outside of Negros Oriental and were hard to reach which reduced the response rate and so electronic version of the survey questionnaire was sent thru their e-mails and/or social media (e.g., Facebook). Those graduates who were not reached were not considered as respondents in this study. The gathering of data was done in September to December 2018.

3.3. Tool

The data-gathering instrument used by the researchers to get the needed information is the standard Graduate Tracer Study (GTS) developed by the Commission on Higher Education (CHED) of the Philippines. Data was processed, organized, and analysed using MS Excel. Descriptive statistics was used to summarize and organize data in frequency and percent distribution tables.

3.4. Ethical consideration

The following were the ethical issues of the study which were addressed by the researchers. The researchers ensured that the respondents read and signed the informed consent form that vouched for the voluntary nature of their participation. The researchers, likewise, made sure that no person or organization was harmed throughout the conduct of the study. Also, the researchers protected the respondents’ identity by presenting the result in general and not mentioning individual responses that may lead to their identification. Finally, the researchers, in the entire duration of the study, especially during data gathering, respected the decision of the respondents who decided to withdraw their participation even if they have already signed the informed consent form.

Table 1

ITD and CSD number of graduates and number of respondents from year 2015–2017.

Programs	Batch 2015			Batch 2016			Batch 2017		
	No. of Graduates	No. of Respondents	%	No. of Graduates	No. of Respondents	%	No. of Graduates	No. of Respondents	%
B.S. Information Technology	33	28	84.85	40	36	90.00	40	33	82.50
B.S. Computer Science	25	20	80.00	39	37	94.87	27	23	85.19
total	58	48	82.76	79	73	92.41	67	56	83.58

4. Results and discussion

This section reveals the respondents' personal characteristics (sex and civil status), whether or not the graduates are employed, whether or not the graduates' first job is related to their program in college, reasons why some respondents are not yet employed, respondents' employability status, gross monthly earning in respondents' first job, length of time it took the respondents them to land in their first job, whether or not the curriculum in college is relevant in their first job, and the competencies learned in college that respondents find useful in their job.

Table 2 below shows the sex and civil status distribution of ITD and CSD graduates. Among the 177 respondents of the study, 124 (70.06%) were female and 53 (29.94%) were male. Only 11 got married (or 6.21%) and 166 (93.79%) were single.

As revealed in Table 3, 78.53% (or 139 out of 177) of the respondents are already employed. This percentage of employability is even higher compared with the findings in the study of Del Rosario (2019) which reported 68% employability of Bachelor of Industrial Technology graduates from year 2013–2016. The result in this study in terms of the percentage of employability is almost the same as in the study Billo et al. (2017), which is 82.05% (or 96 out of 117). The study of Billo et al. (2017) covered the employability of BSCS, BSIT, and Associate in Computer Science Graduates from year 2014–2016. This implies that BSIT and BSCS graduates are able to contribute to the growth of national and local economy.

On the other hand, when this study was conducted, 21.47% (or 38 out of 177) of the respondents are not yet employed. With 21.47% who are unemployed in this study, such finding lends support to the conclusion of Pan and Lee (2011) that "owing to the dramatic increase in enrolment rate of higher education, a diploma is no longer a guarantee of employment and higher education institutes are expected to equip students with employability skills and attributes." According to Ahmad et al. (2012), graduates are competing among themselves to meet the job market in various sectors. Because of the limited amount of jobs available, many graduates end up unemployed.

However, the study of Balingbing (2014) yielded an interestingly low unemployment rate with only 2.60% (or 4 out of 155 respondents). Nevertheless, 69.78% (or 97 out of 139) believed that their first job is related to the program (BSIT or BSCS) they took up in college. This

percentage is even higher compared to the 59.5% respondents in the study of Woya (2019) who perceived that their work is directly aligned to their field of study.

As can be gleaned from Table 4, family concerns are the primary reason why some graduates are not yet employed. Furthermore, family concern was also the primary reason why some graduates are not yet employed in the study of Billo et al. (2017). Interestingly, ranked at the bottom of this category are "qualifications did not fit for the job," "further studies," "health-related concerns," and "did not look for a job yet". This data implies that those who are not yet employed at the time this study was conducted did not perceive their qualifications, desire for further studies, health, and interest to look for a job as essential issues for being unemployed (Table 5).

Most of the respondents in this study (46.04% or 66 out of 139) have regular employment status. This is a good development in the graduates' career since they have already obtained security of tenure. The study of Woya (2019) recorded a much higher percentage of respondents with permanent employment status which is 65.8% (52 out of 79) among statistics graduates from year 2012–2016 at Bahir Dar University in Ethiopia.

Likewise, most of the respondents (49.64% or 69 out of 139) are earning P10,001 to 15,000 per month (as shown in Table 6). This finding is different from the study of Billo et al. (2017) which found out that the majority of the respondents (52.08%) were earning P5,001 to 10,000. This implies that the monthly earning of graduates is increasing over the years.

Table 7 reveals that when it comes to the length of time it took the respondents to land in their first job, it took one year to less than two years for the 28.06% (or 39 out of 139) of the respondents to land in their first job. It is also noteworthy that it took 1–6 months for 25.90% (or 36 out of 139) of the respondents to find their first job. The finding in this study is contrary to the finding in the study of Billo et al. (2017) which found out that it took less than one month for most of the respondents (48.95%) to land in their first job. However, this present study does not argue whether or not the respondents' first job is related to the program they graduated in. This is something that future studies may consider to include.

On the contrary, Ahmad et al. (2012) found out that "within five months after they graduated, the total graduates employed are 56%,

Table 2

Sex and civil status of respondents.

Program	Batch	Profile							
		Sex (N = 177)				Civil status (N = 177)			
		Male		Female		Single		Married	
B.S. Information Technology	f	%	f	%	f	%	f	%	
	2015	7	25.00	21	75.00	27	96.43	1	3.57
	2016	16	44.44	20	55.56	35	97.22	1	2.78
B.S. Computer Science	2017	11	33.33	22	66.67	33	100.00	-	-
	2015	2	10.00	18	90.00	17	85.00	3	15.00
	2016	11	29.73	26	70.27	34	91.89	3	8.11
total	2017	6	26.09	17	73.91	20	86.96	3	13.04
		53	29.94	124	70.06	166	93.79	11	6.21

Table 3

Whether or not Respondents are Presently Employed and. Relatedness of Respondents' First Job to the Program they took up in College.

Program	Batch	Whether or not graduates are presently employed and whether or not their first job is related to the program they took up in college									
		Whether or not graduates are presently employed (N = 177)					Whether or not their first job is related to the program they took up in college (N = 139)				
		Employed		Not employed			Related		Not related		
		f	%	f	%		f	%	f	%	
B.S. Information Technology	2015	22	78.57	6	21.43		17	77.27	5	22.73	
	2016	35	97.22	1	2.78		26	74.29	9	25.71	
	2017	19	57.58	14	42.42		15	78.95	4	21.05	
B.S. Computer Science	2015	13	65.00	7	35.00		9	69.23	4	30.77	
	2016	37	100.00	-	-		23	62.16	14	37.84	
	2017	13	56.52	10	43.48		7	53.85	6	46.15	
total		139	78.53	38	21.47		97	69.78	42	30.22	

Table 4

Reasons Why Some Respondents are not yet Employed.

Program	Batch	Reasons why some graduates are not yet employed (N = 38)									
		Further studies		Family concern		Health-related reason/s		No job opportunity		Did not look for a job yet	
		f	%	f	%	f	%	f	%	f	%
B.S. Information Technology	2015	-	-	4	10.53	-	-	1	2.63	1	2.63
	2016	-	-	1	2.63	-	-	-	-	-	-
	2017	1	2.63	6	15.79	1	2.63	5	13.16	-	-
B.S. Computer Science	2015	-	-	4	10.53	-	-	-	-	3	7.89
	2016	-	-	-	-	-	-	-	-	-	-
	2017	-	-	5	13.16	-	-	5	13.16	-	-
total		1	2.63	20	52.63	1	2.63	11	28.95	4	10.53
										1	2.63

Table 5

Respondents' Employment status.

Program	Batch	Employment status (N = 139)									
		regular		temporary		Casual		contractual		self-employed	
		f	%	f	%	f	%	f	%	f	%
B.S. Information Technology	2015	18	81.82	-	-	2	9.09	2	9.09	-	-
	2016	27	77.14	3	8.57	1	2.86	4	11.43	-	-
	2017	4	21.05	1	5.26	4	21.05	7	36.84	3	15.80
B.S. Computer Science	2015	5	38.46	2	15.39	1	7.69	5	38.46	-	-
	2016	9	24.32	2	5.41	4	10.81	21	56.76	1	2.70
	2017	1	7.69	4	30.77	-	-	8	61.54	-	-
total		64	46.04	12	8.63	12	8.63	47	33.81	4	2.88

Table 6

Gross monthly earning in respondents' first job.

Program	Batch	Gross monthly earning in graduates' first job (N = 139)											
		less than P5,000		P5,001–10,000		P10,001–15,000		P15,001 to 20,000		P20,001 to 25,000			
		f	%	f	%	f	%	f	%	f	%		
B.S. Information Technology	2015	1	4.55	13	59.10	8	36.35	-	-	-	-		
	2016	-	-	10	28.57	21	60.00	3	8.57	-	1	2.86	
	2017	-	-	2	10.53	11	57.89	6	31.58	-	-	-	
B.S. Computer Science	2015	-	-	2	15.38	7	53.85	3	23.08	1	7.69	-	
	2016	3	8.11	16	43.24	17	45.95	1	2.70	-	-	-	
	2017	1	7.69	2	15.39	5	38.46	4	30.77	1	7.69	-	
total		5	3.60	45	32.37	69	49.64	17	12.23	2	1.44	1	.72

another 10% decided to further their studies at master's level, and the remaining 34% are still unemployed". Also, in the study of [Del Rosario \(2019\)](#), p. 42% of their respondents was able to find jobs in 2–5 months after graduation.

[Table 8](#) demonstrates how the respondents evaluated in retrospect the relevance of curriculum to their first job. It emerged that when asked

whether or not the curriculum they had in college is relevant in their first job, majority of the respondents (69.78% or 97 out of 139) declared that the curriculum of the program they had in college is indeed relevant (See [Table 8](#)). The result in this study lends support to the idea that "competitive graduates in the job market often depend on a strong curriculum of the programs" ([Ahmad et al., 2012](#)).

Table 7

Length of Time it Took the Respondents to Land in their First Job.

Program	Batch	Length of time it took the graduates to land in their first job (N = 139)									
		less than 1 month		1–6 months		7–11 months		1 yr to less than 2 years		2 years to less than 3 years	
		f	%	f	%	f	%	f	%	f	%
B.S. Information Technology	2015	1	4.55	3	13.63	9	40.91	6	27.27	2	9.09
	2016	9	25.71	5	14.29	2	5.71	16	45.71	3	8.57
	2017	1	5.26	10	52.63	4	21.05	4	21.05	-	-
B.S. Computer Science	2015	4	30.77	4	30.77	2	15.38	3	23.08	-	-
	2016	7	18.92	9	24.32	5	13.52	9	24.32	7	18.92
	2017	2	15.39	5	38.46	5	38.46	1	7.69	-	-
total		24	17.26	36	25.90	27	19.42	39	28.06	12	8.63
										1	.72

Table 8

Whether or not the Curriculum is Relevant in the Respondents' First Job.

Program	Batch	Whether or not the curriculum is relevant in the graduates' first job (N = 139)			
		Yes, the curriculum is relevant		No, the curriculum is not relevant	
		f	%	f	%
B.S. Information Technology	2015	18	81.82	4	18.18
	2016	29	82.86	6	17.14
	2017	14	73.68	5	26.32
B.S. Computer Science	2015	7	53.85	6	46.15
	2016	20	54.05	17	45.95
	2017	9	69.23	4	30.77
total		97	69.78	42	30.22

It goes beyond telling that the curriculum has to be relevant in relation to the demands of the industry, because “impractical university curriculum is one of the factors that cause graduates’ skills gap, along with other factors like constant changes in the labor market, and students’ passivity in planning and developing their career” (Tran, 2018).

Table 9 indicates that communication skills are considered by majority of the respondents (58.99%) as the foremost competency they learned in college that they find useful in their job. It is noteworthy that some respondents who participated in this study are employed in IT-BPO companies where communication is a highly valued competency. This finding is parallel to the claim of Martin (2014) “that communicative competence can greatly help new graduates to develop their potential, both socially and occupationally”. His study further suggests that “the importance of communicative competences should be included in the new educational context to enhance the employability and productive force of future graduates” (Martin, 2014).

Aside from communication skills, “information technology skills” is the second-highest competency (27.34%) believed by the respondents to be useful in their job. Ranked at the bottom in this category are

entrepreneurial skills, critical thinking skills, and problem-solving skills with a percentage of 5.04%, 7.19%, and 15.83%, respectively. This finding is contrary to the finding in the study of Cañizares (2015) where critical thinking (along with literacy skills, problem-solving skills, numeracy skills, and content specific knowledge) emerged excellent as a skill being developed by the graduates. In conjunction to that, Siraye et al. (2018) concluded that “supervisors desire employees who can identify problems and their essential components at the workplace”.

5. Conclusions

The insights gathered from this present study are significant for various reasons. First, the results of this study are significantly important to recognize and address curriculum-related issues, reasons for graduates’ unemployment, graduates’ employment status, monthly salary, and duration of job search. Second, competencies in greatest need of curricular attention according to the perception of the respondents are entrepreneurial skills, critical thinking skills, problem-solving skills, and human relations skills. Third, current and prospective students of Information Technology Department and Computer Science Department in NOrSU BSC shall have a basis for curricular and career preparation considering the fact the previous graduates of the said departments have good employability and they found the curriculum relevant to their jobs. Lastly, results of this study may be used in improving NOrSU BSC’s academic and career guidance program and student services especially in enhancing students’ capability with regard to job entry skills by conducting a seminar-workshop before they graduate.

The researchers conclude that the 177 graduates of Information Technology Education (B.S. Information Technology and B.S. Computer Science programs) who served as respondents in this study are employable with jobs which are related to their program in college. Furthermore, family concern was perceived as the primary reason why some of the respondents are not yet employed at the time the survey was conducted. Fortunately, most of the respondents have regular employment status, which consequently provides them the so-called security of

Table 9

Competencies Learned in College that Respondents Find Useful in their Job.

Program	Batch	Competencies learned in college that graduates find useful in their job (N = 139)									
		Communication Skills		Human relation skills		Problem-solving skills		Information Tech. skills		Entrepreneurial skills	
		f	%	f	%	f	%	F	%	f	%
B.S. Information Technology	2015	14	46.70	3	10.00	3	10.00	7	23.33	1	3.33
	2016	15	35.71	5	11.91	8	19.05	14	33.33	-	-
	2017	14	48.27	7	24.14	2	6.90	4	13.79	-	-
B.S. Computer Science	2015	24	61.54	3	7.69	5	12.82	4	10.26	2	5.13
	2016	6	21.42	4	14.29	4	14.49	6	21.43	3	10.71
	2017	9	50.00	5	27.77	-	-	3	16.67	1	5.56
total		82	58.99	27	19.42	22	15.83	38	27.34	7	5.04
										10	7.19

Note: Every respondent answered more than one competency.

tenure. Most of the respondents are also earning P10,001 to 15,000 per month – an amount modest enough to enable them to live decent lives. However, as compared with previous studies, it took the respondents in this study more prolonged time (1 year to less than 2 years) to land in their first job.

Regarding the curriculum content of Information Technology Education programs, it can be concluded that it is relevant to the respondents' job. The respondents' first job is also related to the program they took up in college. Finally, the two most identified competencies, which the respondents found useful in their jobs are communication skills and information technology skills.

6. Recommendations

The following recommendations are made taking into consideration the results in this study.

- a. To further enhance the marketability of BSIT and BSCS programs and the employability of the graduates they produce, periodic review of curriculum by academic leaders, alumni, and industry representatives is imperative to ensure that graduates are equipped with the necessary knowledge and skills to make them highly employable in the industry.
- b. Industry immersion of faculty members during semestral or mid-year breaks to identify the emerging and changing needs and competencies required in the industry and necessary revision of curriculum for better fit.
- c. Students should have a highly relevant on-the-job station to provide them with a rich opportunity to meaningfully experience and analyse the skills required in the world of work.
- d. Graduate tracer studies like this should be conducted regularly at least every other year covering wider scope in terms of graduates in previous years to establish a more robust data that reflects the employability of the graduates.
- e. For further studies, other variables related to graduates' employability may be explored like effects to the graduates of being unemployed, number of times the respondents changed job, number of respondents with regular employment status whose jobs are either related or not related to their course, job satisfaction and promotion, congruence between curriculum and skills that industry expects from would-be employees, among others.
- f. Finally, further studies may also identify and analyse the specific professions/careers/occupations of BSIT and BSCS graduates that the institution and the Commission on Higher Education expects them to have as specified in CHEd Memorandum Order No. 25, series of 2015 known as the Revised Policies, Standards, and Guidelines for Bachelor of Science in Computer Science (BSCS), Bachelor of Science in Information System (BSIS), and Bachelor of Science in Information Technology (BSIT) Programs. Specifically, future researches should identify how many of the graduates have assumed the primary and secondary job roles prescribed in the said order [1].

Note

[1] For the Bachelor of Science in Computer Science, the primary job roles are as follows: software engineer, systems software developer, research and development computer professional, application software developer, and computer programmer; the secondary job roles are as follows: systems analyst, data analyst, quality assurance specialist, and software support specialist. For the Bachelor of Science in Information Technology, the primary job roles are the following: web and applications developer, junior database administrator, systems administrator, network engineer, junior information security administrator, systems integration personnel, IT audit assistant, and technical support specialist; the secondary job roles are the following: quality assurance specialist, systems analyst, and computer programmer.

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Albert C. Albina: Conceptualization, Methodology, Writing - original draft, Investigation, Visualization, Project administration, Writing - review & editing. **Lilian P. Sumagaysay:** Conceptualization, Data curation, Validation, Investigation, Supervision, Writing - review & editing.

Declaration of competing interest

The authors of the correspondence do not have any conflict of interest to declare.

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