Industrial education competencies: Valuing students stakeholder's role in the academe

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Abstract

Over the years, the Technological University of the Philippines sustains the rank as a highly performing State University in the Philippines in terms of the employability of the graduate students. This qualitative research aimed to explore the relevance of competencies of the graduates of Industrial Education from the school year 2013 to 2017. Convenience sampling techniques were employed in the selection of the respondents. A validated survey questionnaire was utilised to investigate the necessary educational competencies and their relevance to the current labour market. The gathered data were treated statistically using frequency counts, percentage, mean and ranking. Results revealed the relevance of the educational competencies to the current industrial curricula and the importance of academic–industry stakeholders. Hence, the results of the study can be utilised as a basis for the enhancement of collaboration among the academic-industry stakeholders and curriculum development in the aspect of the knowledge-based and competency-based academic performance for productivity.

Keywords: Academic–industry stakeholders, collaboration, curriculum development, educational competency, industry competency.

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1. Introduction

The topmost indicator of successful graduates is being equipped with adequate knowledge, skills and attitudes required of the labour market (Pinheiro, Langa & Pausits, 2015). This has been the challenge of academic and industry actors of their vital role in this age of industrial competition (Pinheiro, Wangenge-Ouma, Balbachevsky & Cai, 2015). Similarly, it is also a pivotal role of the higher education (HE) to explore the emerging trends for the development of the highly skilled human capital (Gines, 2014; Ramirez, Cruz & Alcantara, 2014). In the past years, the Technological University of the Philippines (TUP) was ranked at Level 4 based on the State Universities and Colleges (SUC) levelling. SUC levelling by the Commission on Higher Education (CHED) is an instrument which measures the productivity performance level of the Philippine Higher Education Institutions (HEIs). Ranked Level 5 as the highest performing HEIs and ranked Level 1 are the non-compliant HEIs to the criteria set by the CHED being the highest governing body of the Philippine HEIs. The criteria of the performance indicator are on the advance higher education, research, community or extension services, and production. However, during the performance measures covering the years from 2011 to 2016, the TUP was reverted to Level 3 for non-compliance on the percentage of employability of the graduates in the areas of advanced higher education. It is in this reason that the current study intends to investigate the specific competencies of the graduate and undergraduate students of Industrial Education in the Technological University of the Philippines. The investigation procedure was made through a tracer study approach. Tracer study is a widely used investigation instrument by academic institutions to keep track of the graduates, especially in evaluating the quality and relevance of educational quality indicators. It is a powerful tool in evaluation quality performance of graduates in their respective workplace (Cuadra, Aure & Gonzaga, 2019). It is also used as the basis for crafting relevant curriculum enhancement, reviews and planning for quality assurance (Badiru & Wahome, 2016). Woya (2019) expounded that knowledge of the tracer study can help academic stakeholders formulate relevant policies to keep track of the accessibility and quality of graduates. Tracer study for university graduates postulates that study success is proven by professional success (Alvarez, 2020). The tracer study of Karunathilake, Bandara, Damayanthi, Ventura and Malkanthi (2010) on the employability of technical college graduates in Sri Lanka gathered information with the use of variables measured by questionnaire and interview found out that their curriculum was still effective and relevant to the jobs of their graduates. The International Labour Organization 2005 states that 'tracer study is an assessment tool where the impact on target groups is traced back to specific elements of the program so that effective and ineffective project component maybe identified'. Further Schomburg (2007, p. 6) noted that graduate surveys are conducted for analysis of the educational institution and work particularly on measuring professional success. However, the current study utilised tracer study to bridge the gap between the competencies of the curriculum with the needs of the labour market. Competencies in the curricula as the key performance indicators of the CHED stipulated in the Memorandum No. 42 s.2010, requires all HEIs to trace back the performance of graduates of HEIs. It is also incompliance with the Accrediting Agency of Chartered Colleges and Universities in the Philippines (AACCUP) Incorporated. The National Higher Education Research Agenda of the Philippines likewise requires that all HEIs should have a regular curriculum program enhancement to maintain the relevance of the competencies required of the industry.

1.1. Graduate competencies

Competencies include knowledge, skills and attitude which the graduate should possess in order to do their task in a particular activity (Morris, Webb, Fu & Singhal, 2013). For Miller, Wesley and William (2012, p. 351), competencies like knowledge, skills and attitude are preparations for employment. It is attributed to student abilities, intellectual capacities and attitude (Gupta & Ross, 2001). These groups of researchers perceived that educational competencies are preparations for job performance. However, other researchers like Young and Chapman (2010) believed that competency is a generic term that would depend on the context of the professional application (Male, 2010; Strijbos, Engels & Struyven, 2015). The researchers acknowledged the different labelling of the term competencies. In the current study, the term competency is alternately labelled as a word to represent the standard knowledge, skills and behaviours at the integrated outcomes of academic–industry collaboration. To Hillebrand and Biemans (2003), working with industry is important in the identification of the success indicators of the curriculum. Marhl and Pausits (2011) and Perkmann et al. (2013) proved the necessity of quality and standard success indicators in the academy paved the way for a stronger collaboration between educational institutions and industry. For Vykydal, Folta and Nenadal (2020), it is the stakeholder's contribution in state universities that provide a valuable tool to articulate a clearer direction of all schools' activities and results.

Presumably, there were differing concepts on competencies, as success indicators from industry differs from another. Although universities play a vital role in the integration of educational knowledge, skills and attitudes, industries also serve as a partner in economic development in the time of knowledge-based societies (Pinheiro, Langa et al., 2015). This research study is focused on the investigation of the specific competencies of the curricula that should be geared toward professional competence and employment (Sánchez et al., 2018).

1.2. Significance of industrial education competencies to curriculum development

The purpose of this study was to explore various feedback from the graduate and undergraduate students from the different programs in Industrial Education. Feedback on the understanding of the expected professional and employment competencies that can be attributed to the quality of the curriculum offered in the Philippine Industrial Education. Darling-Hammond, Hyler and Gardner (2017, p. 17) said that 'analysing student work collaboratively gives teachers opportunities to develop a common understanding of what instructional strategies may or may not be working and for whom'. According to Pinheiro, Langa et al. (2015), academic stakeholders play an important role in curriculum development. Darling-hammond et al. (2017, p. 20) supported that professionally raised students as n academic stakeholders can help policymakers identify competencies for curriculum enhancement. Hargreaves and Fullan (2012) found out that the combined efforts of these stakeholders resulted in a collaborative culture in the form of professional capital. While providing an avenue of identifying the demands and trends of the changing market employment. It was suggested by Velde (2001) that the competencies should be embedded in both the context of curriculum and employment needs. Durden and Young (2006) asserted that it is necessary for a curriculum to be in congruence with the current demands of the labour market. The current low employment of graduates is the result of unfit competencies in the curricula.

1.3. Perspectives of the Philippines industrial education competencies

The last tracer study conducted in the College of Industrial Education was conducted among the graduate and undergraduate program was last 2013 and the results were utilised in the AACCUP accreditation level 3. This research study was conducted to provide continuity to the last conducted tracer study to trace the status of the graduates to identify the relevance of the program they have received from the university to their current job and to keep track of the record on how well the

university is performing in terms of the graduates. Results of this study can also be utilised as a basis for higher education Curriculum Development.

This research study was based on the stakeholder theory of standardising the academic approach. Harrison, Freeman and Sa de Abreu (2015) found it to be effective when a management approach is based on an ethical perspective which recognises the values of inter-relatedness. Working together in a shared goal is basically making organisation performs best (Harrison et al., 2015) leading to an opportunity (Tantalo & Priem, 2014). It is a practical theory (Harrison et al., 2015) as it values the importance of stakeholders in making informed decisions. Tantalo and Priem (2014) asserted that stakeholders' theory creates engagement. In a quality standard, graduates are the university's product, while the labour market is the client. It is in this reason that the labour market involved higher education institution in decision-making (Davey, Baaken, Galan-Muros & Meerman, 2011). Pinheiro, Langa et al. (2015) and Hargreaves and Fullan (2012) explained that the involvement of academic institutions as a stakeholder plays an important role in curriculum enhancement. In the framework presented by Seppo and Lilles (2012), universities do not limit their functions to research, community services and instruction only. They see the industry as the partner entrepreneurs, technology and innovations, and economic development partner. For Seppo and Lilles (2012) academy and industry work on curriculum development, lifelong learning, student mobility, academic mobility, research and extension (R & D) commercialisation, R & D collaborations, and governance. Also identified by Gardner (2011) are knowledge and technology transfer resulting to knowledge creation (Etzkowitz & Viale 2010; Guerrero, Urbano, Cunningham & Organ, 2012; Philpott, Dolley, O'Reilly & Lupton, 2011).

Moreover, HEIs adapted the ISO 9001:2015 in ensuring the collaborative participation of all the stakeholders of the organisation in standardising the processes, products, and services. HEIs invested for an organisational standard to foster quality in the education process, products, and services. It is also an academic response to sustaining quality standards among HEIs.

2. Methodology

2.1 Research design

This research study utilised the descriptive survey method. In particular, the sample survey which deals only with a portion of population (Sevilla, 1993) which covered the employment characteristics, competencies and skills, educational experience/transition to employment and impact of educational training and the quality of educational experiences from the Technological University of the Philippines.

The convenience sampling technique known as availability sampling technique was used in selecting the respondents of the study. As recommended by Schomburg (2003) on the conduct of graduate tracer study the response rate should be 30%–60%. After consistent follow ups, the researchers retrieved 144 graduate program and 366 undergraduates respondents with a total of 510 which composes 30% of graduates from the last five years were used during the entire study. One thousand two hundred fifty (1,250) questionnaires were sent to the TUP graduates of the school year 2013 to 2017 who are employed in the National Capital Region (NCR) and the nearby provinces.

The allowance of 2 years for the school year 2018 and 2019 gave way for the graduates to prepare for a licensure examination and for the newly hired graduates to at least develop an employment competency. These developed competencies can be translated into an academic competency (Darling-hammond et al., 2012) when they too become a participant of the same tracer study, especially in the enhancement and updating of the academic curriculum.

2.2 Sampling technique

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2.3 Instrumentation and data gathering technique

The researcher used the survey questionnaire as the main data gathering instrument for the study. It was patterned and inspired by the Philippine CHED and other SUCs tracer study the questionnaire. After revision and validation, the modified questionnaire using the Likert scale was fielded.

Different techniques in data gathering in this research study were employed such as telephone calls, social media like e-mails and Facebook. The researcher also personally distributed the questionnaire to some respondents in their respective places of work and conducted informal interviews. The retrieval was made right after the respondents filled up the questionnaire, and It took some time before the respondents have been tracked.

2.4 Data analysis

The data treatment is highly descriptive which utilised the frequency counts, and percentage counts. Statistical means ($\bar{x}$) were used to describe the adequacy of the identified competencies from the study participants. The competencies were also ranked based on the average statistical means ($\bar{x}$).

3. Results

There were a hundred percent of the total respondents were employed. It can be concluded that TUP graduates from 2013 to 2017 were all employed full time at the time of the study.

Table 1. Frequency and percentage of respondents according to current employment status

Program	N	Employed		Not employed
		Frequency	%	Frequency
BSIE/BTTE	366	366	100	0
MA	100	100	100	0
Doctoral	44	44	100	0
Total	10	10	100	0

As gleaned in Table 1, out of 510 respondents, from the BSIE/BTTE 321 are Board passers, and 45 are non-Board passers, from the Masteral, 90 are Board passers and 10 are non-Board passers. From the Doctoral, 39 are board passers while only 5 are non-Board passers. There are 88% board passers and 12% non-Board passers in totality.

In Table 2, the level of competencies from various TUP industrial education programs from the school year 2013–2017 are listed. These include the Bachelor of Science in Industrial Education,

Bachelor of Technology Education, Masters of Arts in Industrial Education, and the Doctor of Education Major in Industrial Education programs in the College of Industrial education of the Technological University of the Philippines. Students graduated from these programs are distributed from various place in the NCR, Caloocan, Malabon, Navotas, and Valenzuela (CAMANVA), Cavite, Laguna, Batangas, Quezon (CALABARZON), and Mindoro, Marinduque, Romblon, Palawan (MIMAROPA) regions.

Table 2. Standard educational competencies

Competencies	Mean ($\bar{x}$)	Interpretation
1. Theoretical Knowledge/Conceptual Skills	4.26	Very Adequate
2. Technical and Practical Skills	4.59	Extremely Adequate
3. English Communication/Speaking Skills	4.12	Very Adequate
4. Ability to present ideas to an audience/public presentation/oral reporting skills	4.40	Very Adequate
5. Correspondence/ Letter Writing Skills	4.12	Very Adequate
6. Research/Technical Report Writing Skills	4.25	Very Adequate
7. Interpersonal/ Human Relation Skills	4.55	Very Adequate
8. Entrepreneurial/ Business Skills	4.27	Very Adequate
9. Basic Computer Skills (Word Processing, Excel, etc)	4.44	Very Adequate
10. Advance Information Technology (CAD, Linux, etc)	3.99	Very Adequate
11. Statistical Software Skills (SPGS, Excel, STATA, etc)	4.0	Very Adequate
12. Management and Leadership Skills	4.52	Extremely Adequate
13. Problem-solving/ Decision-making Skills	4.59	Extremely Adequate
14. Critical thinking/Analytical thinking	4.53	Extremely Adequate
15. Result-orientation and ability to deliver results in time	4.44	Very Adequate
16. Flexibility, adaptability, and ability to work under pressure	4.49	Very Adequate
17. Accuracy and precision	4.44	Very Adequate
18. Ability to work on team	4.53	Extremely Adequate
19. Respect for individual differences/ability to work in a culture rally- diverse work environment	4.67	Extremely Adequate
20. Independence and ability to assume responsibility for one's work	4.58	Extremely Adequate
21. Initiative/Creativity	4.47	Very Adequate
22. Professionalism	4.63	Extremely Adequate
23. Self-confidence and Assertiveness	4.58	Extremely Adequate
24. Commitment	4.58	Extremely Adequate
25. Honesty and Integrity	4.55	Extremely Adequate
26. Diligence and willingness to be trained and to learn	4.67	Extremely Adequate
Overall mean	4.43	Very Adequate

Legend:
4.51–5.00 Extremely Adequate   1.51–2.50   Somewhat Adequate
3.51–4.00 Very Adequate   1.00–1.50   Not Adequate
2.50–3.50 Adequate.

Standard educational competencies in Table 2 show that 'Diligence and willingness to be trained and to learn' was rated with the highest mean ($\bar{x}$) of 4.67 interpreted as Extremely Adequate while 'Advance Information Technology Skills (CAD, Linux, etc)' rank lowest with a mean ($\bar{x}$) of 3.99 interpreted as 'Very Adequate'. The overall mean ($\bar{x}$) is 4.43 interpreted as 'Very Adequate'. Thus, the result confirmed that respondents in this study rated 'Very Adequate' as to the Degree of Educational Experience as to competencies and skills while studying in TUP.

In terms of the professional competencies to the current employment needs, the following table presents the relevance level of each program:

Table 3. Degree of relevance of educational competencies to current employment

Programs	N	Extremely Relevant		Relevant		Somewhat Relevant		Little Relevant		Not Relevant	
		f	%	*f*	%	*f*	%	*f*	%	*f*	%
BSIE/BTTE	366	290	79%	70	19%	6	2%				
Masteral	100	89	89%	10	10%	1	1%				
Doctoral	44	40	90%	4	9%	0	0				
Total	510	419	81%	84	19%	7	3%				

Table 3 shows that as to the degree of relevance of the educational experience of competencies and skills to current employment, BSIE/BTTE, 290 or 79% rated it as 'Extremely Relevant', 70 or 19% rated 'Relevant' and 6 or 2% rated it 'Somewhat Relevant'. In the Masteral program, 89 or 89% rated 'Extremely Relevant', 10 or 1% rated 'Relevant' and only 1 or 1% rated 'Somewhat Relevant' while in the doctoral program, 40 or 90% rated 'Extremely Relevant' and 4 or 9% rated 'Relevant'.

4. Discussions

Overall findings of the study show that industrial education competencies are relevant to the current academic-industry needs. While the outcomes of academic and industry collaboration further enhance and explore the significance of competencies required of the current labour market. Gardner, Fong and Huang (2010) affirmed that academic-industry collaborations form part of the social and economic society. Davey et al. (2011) on the other hand, explained that industry collaboration involved academic institutions in decision making. In fact, Pinheiro, Langa et al. (2015) asserted the importance of industry partnership in this time of knowledge-based society towards professional and employment competencies (Sanchez et al., 2018).

Meanwhile, the respondents of the current research study are all employed in their respective jobs. It is important that their competencies be evaluated to identify industry success indicators relevant for the enhancement of the academic curriculum (Hillebrand & Biemans, 2003; Marhl & Pausits, 2011; Perkmann et al., 2013). Educational competencies seen in Table 2 are the relevant industrial education competencies identified by the 510 graduates of the Technological University of the Philippines from the school year 2013 to 2017. These educational competencies are the relevant industrial competencies that TUP graduates of the various industrial education programs which in turn form part of the integrated curriculum competencies. Curriculum competencies that timely to acquire by the industrial education students in preparation for the job available in the market. When acquired by the students, these will form part of their knowledge, skills, and attitude that qualified them for the world of work (Miller et al., 2012, p. 351; Sanchez et al., 2018; Verma & Dahiya, 2016). Hence, educational institutions should consider graduate students as stakeholders in the curriculum development (Hargreaves & Fullan, 2012). Graduate students as stakeholder could also serve the agents of evaluating the university quality standard products, and services in compliance with the performance measures of the Philippines higher education authorities.

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5. Conclusion

Generally, industrial competencies are embedded in the curriculum contents of academic programs. On the other hand, academic competencies in the curriculum are the same competencies that are needed for employment. Graduate students being the respondents of the study likewise confirmed that aside from other schools' stakeholders, like the community, the university officials, and teachers, students also play an important role in the curriculum development as they have direct employment experiences with the labour market. This is consistent with the study of Hargreaves and Fullan (2012) who revealed high regards for the academic–industry partnership. It is now becoming a trend that a regular evaluation and updating of the curriculum will professionally equip students with the technological and social resources (Hillebrand & Biemans, 2003; Meerza & Beauchamp, 2017) for employment. It is the technological awareness integrated in the curriculum that provides adequate knowledge, skills, and behaviours of students in preparation for the world of work (Hendawi & Nosair, 2020; Mcgowan, Cooper, Durkin & O'Kane, 2015; Sanchez et al., 2018; Verma & Dahiya, 2016).

6. Recommendations

As reflected in the study results, university stakeholders should collaboratively work together to sustain the relevance of competencies to the changing educational and industrial needs. In fact, for purposes of regularly maintain competence in the curriculum needs, the researcher suggested to regularly update for the enrichment of curricular programs. Further, graduate faculty be required to conduct scholarly research in their respective specialisations, and disseminate relevant contributions to the new knowledge as per recommendations of the CHED and the AACCUP Inc.

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