COLLABORATION AND INDUSTRY INVOLVEMENT ENHANCES THE EMPLOYBILITY OF BCT PUO GRADUATES

[1]Samikhah Muhammad @ Munir, [2]Mazziyatol Farizza Mat, [3]Noraziah Hamid

[1,2,3]Politeknik Ungku Omar, Malaysia
[1]samikhahpuo@gmail.com
[2]mazziyatol@puo.edu.my
[3]aziahhamid1965@gmail.com

Abstract: Collaboration is the fifth (5) pillar in Department of Polytechnic and Community College Education (DPCCE) Strategic Plan 2018-2025 by increasing cooperation with the industry. Thus, Work-Based Learning (WBL) aspires to enhance the students' learning experience by extending the industry's collaboration in the design and delivery of technical education programmes. The outcome of this strategy is expected to produce work-ready graduates with rapid technology advancement competencies in terms of technical, personal and interpersonal skills that can be acquired through experiential learning that is included in the curriculum. Hence, the Work-Based Learning (WBL) educational strategy helps build the inner strength of polytechnic students to face the challenges of 21st-century learning and the demands of the 4th Industrial Revolution. The objective of this study is to focus on PUO-Industry strategic collaboration for work-based learning for undergraduate students via structured on-the-job training (OJT) for a period of 10 months. The signing of Notes of Collaboration (NoC) between PUO and industry players has opened great opportunities to the student whilst undergoing their WBL as attachment placement at the participating companies is secured. The findings strongly validate the empowerment of BCT graduates' marketability by engaging in industry collaboration. Trend analysis of six (6) WBL cohorts had been analysed to display data over time of graduate employability rate. The result shows that 4 out of 6 cohorts have a 100% graduate employability rate and more graduates were hired by company outside of MBAM participating companies' bubbles. These graduates have been employed either by the partners' company or other companies in the same field locally and overseas, some became entrepreneurs, others pursue further studies.

***Keywords**: PUO-Industry, Structured OJT, WBL, Work-ready, Graduate Employability*

1. Introduction

Those employability skills are considered a valuable asset to employers (Mohamad Sattar et al., 2010; Mohamad Sattar et al., 2012; Makhbul, Yussof & Awang, 2015) and also help to gain the competitive advantage as well as leads survival the organization products or services in the global market (Anuar et al., 2016; Hanapi et al., 2016; Rahmat et al., 2016). Similarly, through the study of Yelasmanchili (2018), the aspects of employability skills such as leadership skills will influence the culture of critical thinking and build more competitive teamwork within an organization. As such, students need to be exposed to the real working environment, thus, higher education institutions shall create access to established resources to enhance their

personal experience. Employability skills are also known as job readiness skills which are needed by students to prepare themselves to become competent and competitive worker after they have completed their studies. According to Hillage and Pollard (1998), the term employability skills is a capability to move sufficiency within the labour market to realize a potential through sustainable employment. In a similar perspective, according to Naddhirah (2014) and Mohammad Sattar et al. (2014), employability skills are an individual capability for his or her own to practice and determine the skills of employability to sustain and cater in a job environment. In general, employability skills required not only to gain employment, but it's also a progress of employee to carry out their role to the best of their ability towards achieve the potential strategic organization or business.

These are timely initiatives, as a study by MOHE. The study showed that the graduate employability rate decreased by 1.8% in 2020. The 2020 Graduate Tracking Study found that Malaysian graduates had a marketability rate of 84.4%, compared to 86.2% in the previous year. In other words, up to 40,550 graduates were not able to secure a job within six months of graduating. To help make it easier for graduates to find out about job offers and other opportunities, the government introduced Graduates Reference Hub for Employment and Training (GREaT) in September 2020. The one-stop portal now even includes a feature to automatically match unemployed graduates with suitable job vacancies found in their database. Nevertheless, a positive sign is that polytechnic graduates are in high demand, with a marketability rate of over 90% for five years in a row. Despite the pandemic, polytechnic graduates still had a 91.2% marketability rate in 2020. That is why the Ministry of Higher Education will continue to look at the betterment of the Technical and Vocational Education and Training (TVET) programme as a whole, along with programme accreditation and recognition at the international level.

2. Methodology

In 2013, Polytechnic Ungku Omar (PUO) commenced WBL program for Bachelor of Civil Engineering Technology with Honours for undergraduates' study and this program implemented work-based learning mode for several courses in semester 7 and semester 8. Therefore, this study is focusing on PUO-Industry strategic collaboration for work-based learning for undergraduate students via structured on the job training for a period of 10 months. The aim of this study is to establish strategic collaboration with construction industries thus enhancing graduate employability. This experience was developed together with the industry partners to meet the training needs of the industry and to provide a real-life work environment. This study applies qualitative and quantitative methods to obtain the necessary data. Graduate tracer study questionnaires were distributed to BCT graduates after completing WBL. While the quantitative data is obtained from WBL monitoring reports, minutes of meeting and appraisal form involving the industry partners.

2.1 Work-based Learning

According to the Engineering Technology Accreditation Council Standard (BEM, 2020), WBL is an industrial training approach that provides students with authentic context for learning and real- life work experiences in an engineering environment. It is essential that the engineering environment must fulfil the aims and learning outcomes of the program. Thus, BCT's WBL is designed as a well-structured on-the-job training (OJT) program developed together with

BCT's industry partners to meet the training needs of an industry and to provide a real-life work environment. It has been designed as a structured internship program with core discipline courses incorporated in the learning track for BCT Year 4.

2.2 WBL Implementation

In facilitating the student's learning process, PUO lecturers and industry mentors use learning activities, learning environment and assessments that align with the learning outcomes (Biggs, 2003). To assist the industry mentors, a team-teaching approach consisting of two or more lecturers teaching the same course are paired-up with the industry mentors (Buckley, 2000). The team-teaching from both PUO and industry will enable them to share ideas and convey knowledge to the students. This can shape the value of teamwork among lecturers and industry mentors in delivering teaching and learning (T&L). The industry mentors oversee the practical aspects of the course whilst the theoretical aspects are led by the PUO lecturers.

The chart in Figure 1, summarizes the implementation of PUO BCT-WBL program. It begins with a meeting with Master Builders Association Malaysia (MBAM), one of the leading body representing the construction industry and services sector in Malaysia. PUO Management Team, MBAM Education Team and several MBAM members have agreed to work together in the structured on the job training (OJT) program known as work-based learning (WBL). Students will be attached to the companies and undergo an Induction Session at the companies. While attached at the company, these students will be assigned industrial task on site based upon the agreed curriculum by their mentor. At the same time students are required to register their courses online, and they will be given tasks accordingly to be completed by the end of the semester.

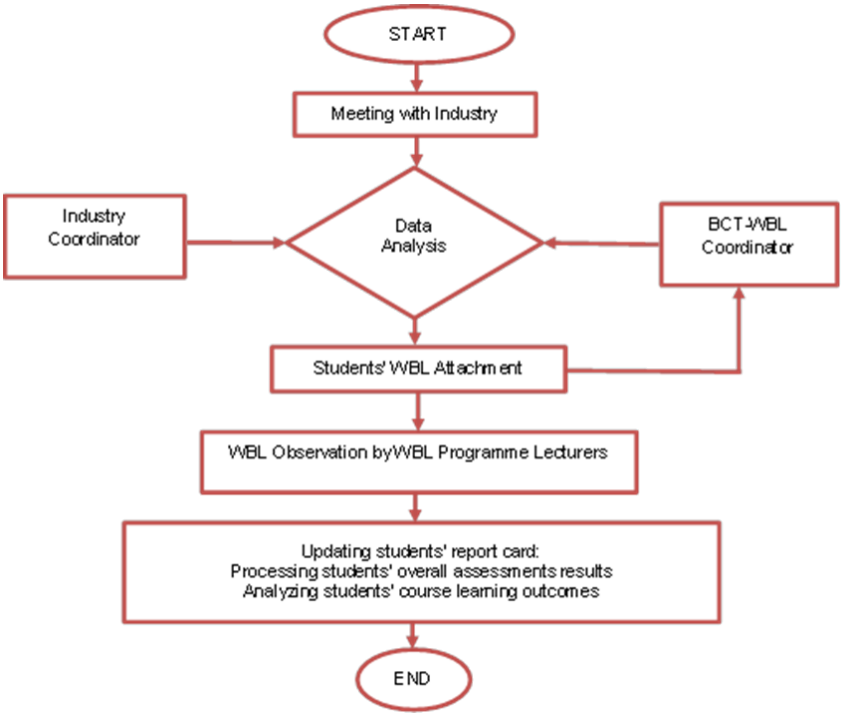


Figure 1. PUO BCT-WBL Implementation Flow Chart

2.3 Collaboration with industry

A successful collaboration between Politeknik Ungku Omar (PUO) and Master Builders Association Malaysia (MBAM) as WBL industry partner for Bachelor in Civil Engineering Technology (BCT) programme had commenced since 2015 when the Notes of Collaboration (NOC) were signed on 9 December 2015 (Figure 2). The Vice President of MBAM, Tan Sri Dato' Sri Sufri bin Mohd Zin, and MBAM Education Committee had coordinated the participation of MBAM member companies in the WBL-BCT programme.

Figure 2. Signing NOC between PUO and MBAM Participating Company

This collaboration had been carried out through various jointly planned activities to increase the effectiveness of WBL implementation in the industry. Table 1 shows the list of companies collaborating with PUO. Until 2021, a total of 22 public listed construction companies had participated in the WBL-BCT as follows:

Table 1. List of companies collaborating with PUO

No.	Company	Collaboration Since
1	Master Builders Association Malaysia	2015
2	Sunway Construction Sdn Bhd	2015
3	Bina Puri Sdn Bhd	2015
4	TRC Synergy Berhad	2015
5	Putra Perdana Construction Sdn Bhd	2015
6	MITC Engineering Sdn Bhd	2015
7	Premier Construction Sdn Bhd	2015
8	Mudajaya Corporation Berhad	2015
9	Syarikat Pembenaan Yeoh Tiong Lay Sdn	2017
10	Fajarbaru Builder Sdn Bhd	2017
11	Ocned Water Technology Sdn Bhd	2017
12	Pembinaan Mitrajaya Sdn Bhd	2017

13	Trans Elite Group Sdn Bhd	2018
14	Bauer (Malaysia) Sdn Bhd	2018
15	MGB Global	2018
16	Dhaya Maju Infrastructure (Asia) Sdn Berhad	2019
17	IJM Corporation Berhad	2020
18	Pembinaan Tetap Teguh Sdn Bhd	2020
19	CLCE Construction Sdn Bhd	2020
20	Matlamat Anggun Sdn Bhd	2021
21	Orange Beam Construction Sdn Bhd	2021
22	Gamuda Berhad	2021

Figure 3 shows the milestone of collaboration between MBAM and PUO since 2015.The good collaboration with MBAM participating company increase number of companies signing NOC with PUO not only for student development but also for thr academia. The WBL approach for BCT programme has been designed as a structured on-the-job training (OJT) programme with core discipline courses incorporated in the learning track for BCT Year 4. The WBL course design integrates theory and industrial practises in the workplace. WBL courses consists of 4 components: Dependent Learning, Independent learning, Industrial Guidance, and Assessment, all of which contribute to the effective learning time and credits calculation (BEM, 2020).

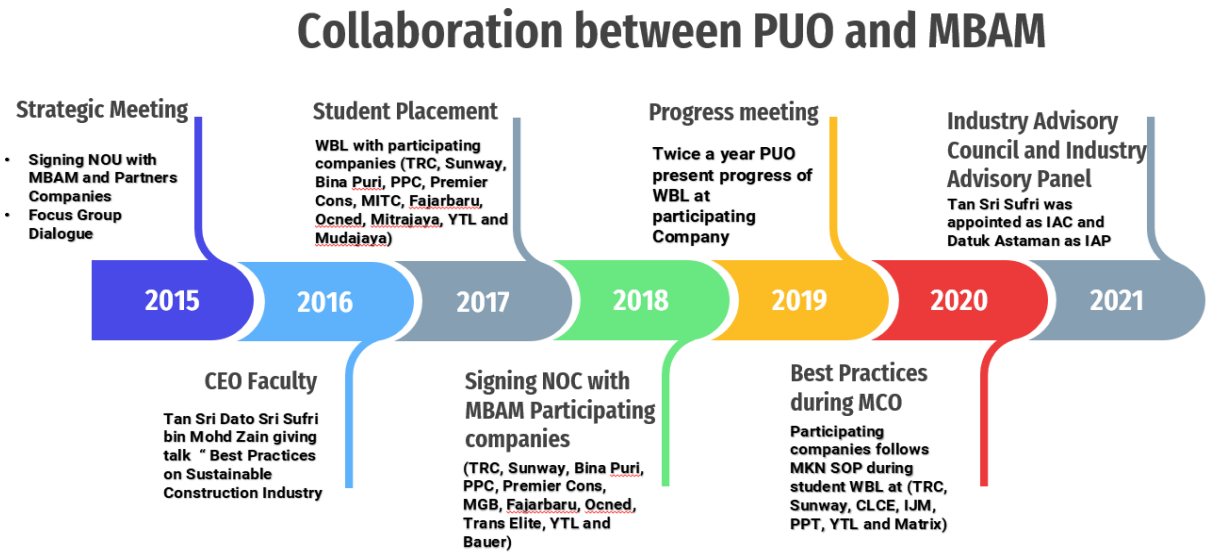


Figure 3. The milestone of collaboration between MBAM and PUO

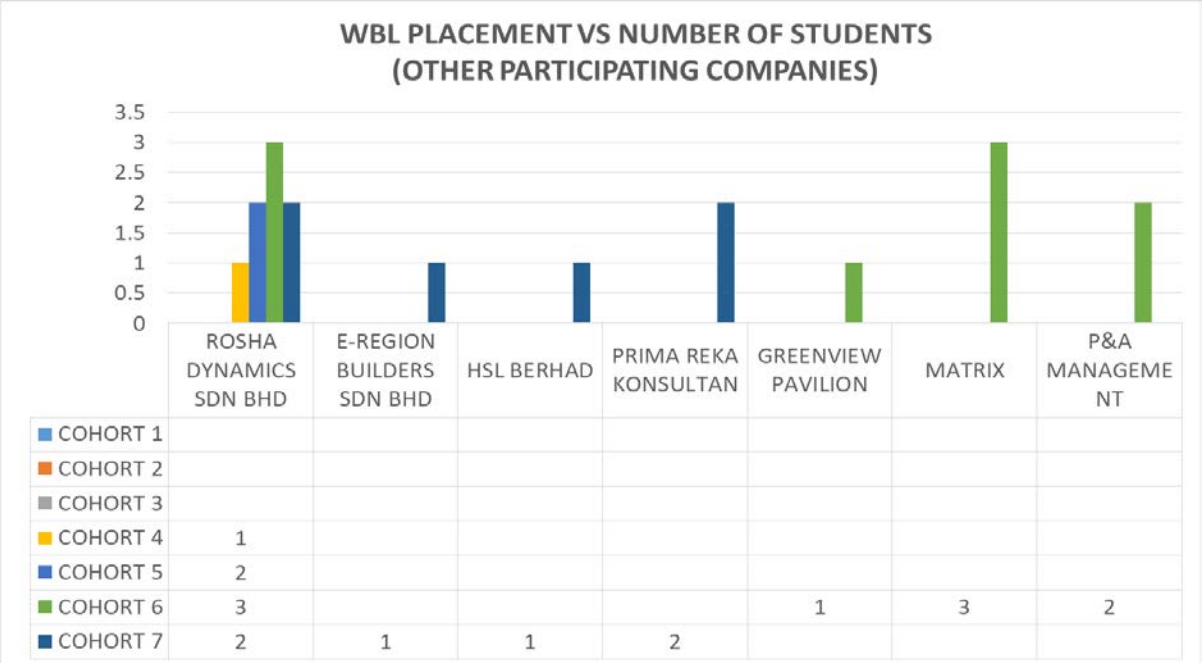
On September 15, 2017, a discussion was held between the Director General of Department of Polytechnic and Community College Education (DPCCE), Prof Dato Dr. Mohd Ismail bin Abdul Aziz, and the Group Managing Director of Trans Resources Synergy Berhad (TRC), Tan Sri Dato' Sri Sufri bin Mohd Zin, to strengthen the industry-academia collaboration. TRC has agreed to enhance existing collaboration by establishing an Industry-Academia Centre or Teaching Factory at PUO. The centre will function as a Technology Enabled Collaborative Centre (TECC) and named TRC Edu Center. TRC has actively implemented the Industrial Visiting Lecturer (PPI) programme at the TRC EDU Center on a regular basis through technical

talks by industrial experts, employability training, technical training and technical visits. The following are some of the benefits received from the establishment of the TRC Edu Center:

i. As a Centre of Technology (COT) for the Department of Civil Engineering based on the concept of sustainable cities.
ii. As a resource centre for lecturers, students, and industry in conducting of reskilling and upskilling programmes.
iii. Technology transfer from TRC to PUO faculty in TRC's specialization of project management and sustainable construction technology.
iv. A conducive environment for knowledge sharing sessions with the Faculty's CEO.
v. Enhancements of Active Learning for PUO students.

3. Results and Analysis

As a result of the success of the collaboration network with MBAM, PUO proceeds with its endeavours to guarantee that students continue to get a placement to undergo WBL. Therefore, there are also other construction companies showing similar interest in placing students to undergo WBL in their companies. The inclusion of these different organizations began in 2018 until the present year. The number of these companies is also expanding from time to time and is very helpful for PUOs in finding student placements as the country faces the threat of the Covid-19 pandemic. Figure 4 and Figure 5 are the number of student placement data at MBAM participating companies and others participating company respectively.



	ROSHA DYNAMICS SDN BHD	E-REGION BUILDERS SDN BHD	HSL BERHAD	PRIMA REKA KONSULTAN	GREENVIEW PAVILION	MATRIX	P&A MANAGEMENT
COHORT 1							
COHORT 2							
COHORT 3							
COHORT 4	1						
COHORT 5	2						
COHORT 6	3				1	3	2
COHORT 7	2	1	1	2			

Figure 4. Student placement data at other participating companies

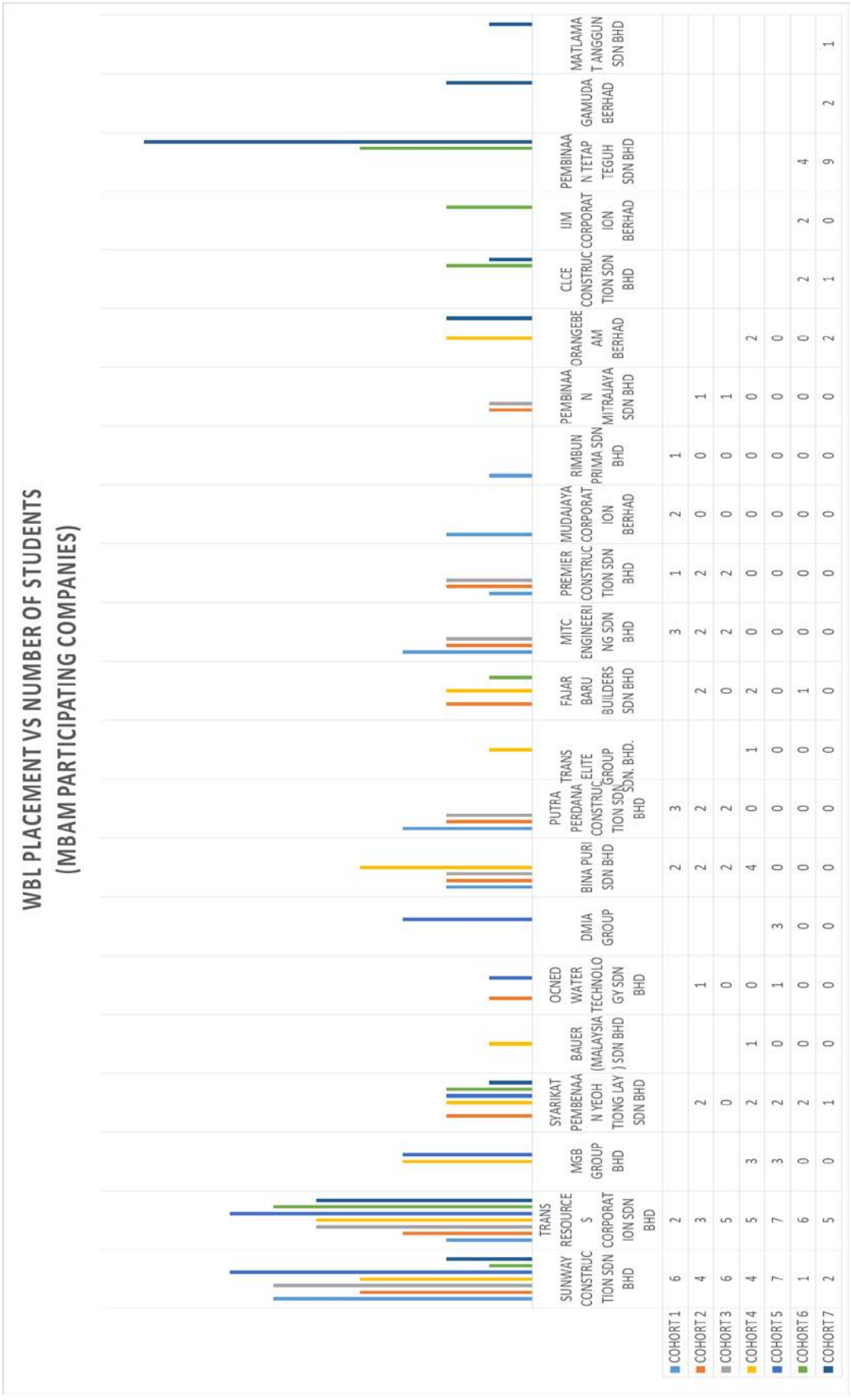
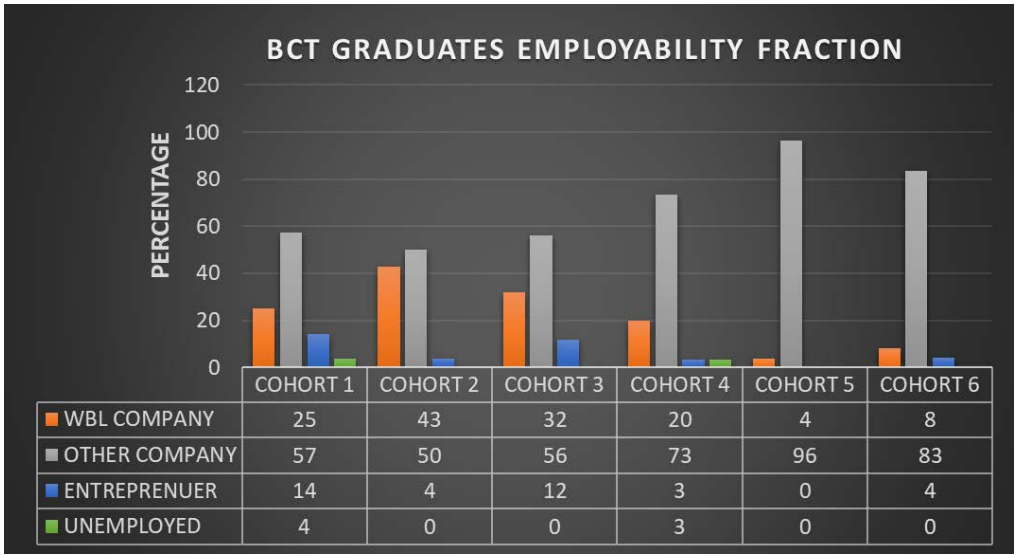


Figure 5. Student placement data at MBAM participating companies

The PUO-BCT WBL program provides a significant opportunity for industry to collaborate with the polytechnic in enhancing competencies and relevant skills among civil engineering technology degree graduates so that they are able to excel in the workplace. Trend analysis of six (6) WBL cohorts had been analysed to display data over time of graduate employability rate. Trend analysis involves collecting the information from multiple periods and plotting the collected information on the horizontal line with the objective of finding actionable patterns from the given information. Trend charts are also known as run charts and are used to show trends in data over time. Displaying data over time increases understanding of the real performance of a process, particularly with regard to an established target or goal. The findings strongly validate the adoption of WBL curriculum for civil engineering technology degree graduates in enhancing graduate employability



	COHORT 1	COHORT 2	COHORT 3	COHORT 4	COHORT 5	COHORT 6
WBL COMPANY	25	43	32	20	4	8
OTHER COMPANY	57	50	56	73	96	83
ENTREPRENUER	14	4	12	3	0	4
UNEMPLOYED	4	0	0	3	0	0

Figure 6. BCT graduates employability fraction percentage

As shown in Figure 6, the percentage of graduates employed by the companies during WBL attachment varies by cohort. However, most of the BCT graduate were employed by other companies as they have completed their WBL. It can be seen that starting from the third cohort, WBL company has employed less graduates rapidly causing other company hiring more BCT graduates. This proves that the collaboration has significant impact on the BCT graduates' marketability outside of the MBAM participating companies' bubble.

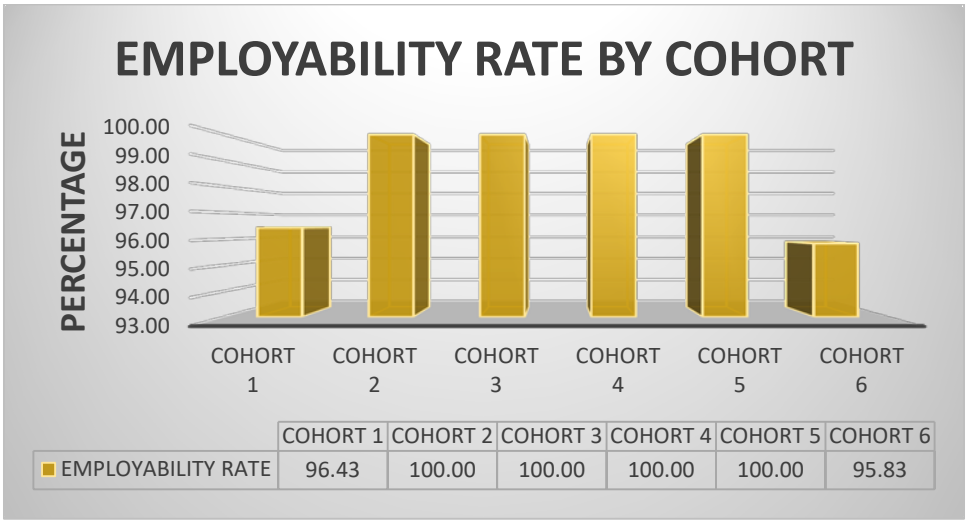


Figure 7. WBL graduate employability rate

The collaboration between PUO and Malaysia leading construction industry, MBAM, has gained a positive impact on BCT graduates' employability. Total time spent at the workplace through WBL (40 weeks) enabled the students to be trained and exposed with real work environment. Students become more competent in both technical and non-technical skills such as personal and inter-personal skills in communication, teamwork, leadership, critical thinking and problem solving. PUO WBL participating companies has given full commitment and they are basically satisfied with the graduates. To date, the BCT programme has had produced 6 cohorts of graduates and all have an outstanding employment rate record. The BCT employability rates are summarized in Figure 7.

4. Conclusion

Overall, it can be concluded that various contexts of real-time work experience enriched through the WBL implementation can provide opportunities for students to develop their early career. In addition to undergoing WBL, students will also be given the opportunity by the industry to undergo industrial certification such as OSH Safety Training and Hazard Identification, Risk Assessment and Risk Control (HIRARC) Training Course, and QLASSIC Training. Furthermore, students will have a good resume record based on the working experience they had acquired from WBL for two semesters. Students are also able to build networking with the people from the companies involved in their WBL projects. Through this networking, students have a better outlook on their career development upon graduation.

The impact of the collaboration had been established an Industry-Academia Centre or Teaching Factory in the Institution and which is capable of functioning as a Technology Enabled Collaborative Centre (TECC) actively implemented the Industrial Visiting Lecturer (PPI) programme on a regular basis through technical talks by industrial experts, employability training, technical training and technical visits. Hence; it can also function as a resource centre for lecturers, students, and industry in conducting of reskilling and upskilling programmes and also encouraging the technology transfer. Impact from the collaboration transferring is the technology from industry to academia from TRC specialization of project management and

sustainable construction technology. It can be simplifying that a conducive environment for knowledge sharing sessions with the Faculty's CEO & Enhancements of Active Learning for PUO students. Tan Sri Sufri bin Mohd Zain as PUO CEO Faculty give impressed speech for all bachelor students from semester 6 and semester 8, regarding soft skill and attitude of fresh graduates to explore construction industry.

The empowerment of BCT graduates marketability by engaging industry collaboration accordingly to be implemented by higher education institutions and industries as Work-Based Learning (WBL) programme to increase the Graduate Employability (GE) as a potential labour in job market with further deepen their competencies in employability skills in real working environment and hence develop their 21st-century skills of communication, collaboration, critical thinking and creativity**.** Therefore; the lack of the requisite knowledge, skills, and attitudes will be trained by implementing the Work-Based Learning (WBL) to provide the students' learning experience by extending the industry's collaboration in the design and delivery of the technical education programmes in the curriculum enhance accelerated students' employability rates. Finally, the PUO-Industry strategic collaboration for Work-Based Learning (WBL) for undergraduate students via structured on job training (OJT) for a period of 10 months is a great contributor to the employability rate of PUO degree graduates and can be achieved by establishing strategic collaboration with construction industries thus enhancing graduate employability (GE).

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