Work-Based Learning Outcomes in TVET: Findings from the Exit Survey of Bachelor of Technology in Electrical System Maintenance

Ts. Dr. Sulaiman bin Sabikan, Ts. Dr. Ahmad Zubir bin Jamil, Ts. Zaihasraf bin Zakaria, Mohd Yunos bin Ali, Ts. Asri Bin Din, Dr. Nur Ezyanie Binti Safie,

Technology Department, Faculty of Electrical Technology & Engineering (FTKE), University Technical Malaysia Melaka (UTeM

DOI: https://dx.doi.org/10.47772/IJRISS.2025.908000461

Received: 10 August 2025; Accepted: 15 August 2025; Published: 16 September 2025

ABSTRACT

Work-Based Learning (WBL) is a key component of Technical and Vocational Education and Training (TVET), bridging the gap between academic learning and industry expectations. This study examines the implementation of WBL in the Bachelor of Technology in Electrical Maintenance System (BELS) at Universiti Teknikal Malaysia Melaka (UTeM) and its impact on student employability and competency development. A quantitative exit survey of 29 final-year students, who completed one year (52 weeks) of WBL at 18 companies, revealed that 51.7% received job offers, with 10.3% officially accepting employment. Additionally, 55% of students received allowances between RM801–RM1000. Self-assessments of Program Learning Outcomes (PLOs) showed strong competency attainment, with PLO8 (Professionalism) and PLO2 (Technology Application) ranking highest, while PLO7 (Management and Technopreneurship) was rated lowest, indicating a need for curriculum enhancement. This study highlights the importance of exit surveys in complementing iPO (Integrated Program Outcomes) attainment, as they provide direct insights into student industry readiness, employability, and curriculum effectiveness beyond academic assessments. The findings emphasize the need for stronger industry engagement, refined assessment methods, and business-related training to enhance WBL effectiveness in TVET education.

INTRODUCTION

Technical and Vocational Education and Training (TVET) plays a pivotal role in Malaysia's economic transformation agenda, ensuring that graduates are equipped with the technical expertise and industry-driven competencies required for a highly skilled workforce (Sekretariat Majlis TVET Negara, 2024). Recognizing the importance of industry-based learning, the Malaysian government has introduced various initiatives to strengthen TVET pathways, including the Dasar TVET Negara 2030 and Malaysia Education Blueprint (Higher Education) 2015–2025, which encourages institutions to implement Work-Based Learning (WBL) models. At the university level, Universiti Teknikal Malaysia Melaka (UTeM) has been at the forefront of this transformation, offering specialized technology-based degree programs, including the Bachelor of Technology in Electrical Maintenance System (BELS) under the Faculty of Electrical Technology & Engineering (FTKE).

To ensure that TVET programs maintain industry relevance and global competitiveness, the Malaysia Board of Technologists (MBOT) plays a critical role in accrediting technology-based qualifications, aligning them with industry standards through the Technology and Technical Accreditation Council (TTAC) Manual. The BELS program at UTeM is mapped to these standards, allowing graduates to meet MBOT's professional competency criteria. This reinforces the importance of TVET degree programs such as BELS, which provide structured Work-Based Learning (WBL) opportunities, ensuring that graduates are not only academically qualified but also professionally competent upon entering the workforce.

Work-Based Learning (WBL) is defined as an educational approach that combines academic learning with real-time applications in the workplace. This method enhances experiential learning by allowing students to gain practical experience in an industry setting, bridging the gap between theoretical knowledge and practical skills

(Malaysian Qualifications Agency, 2016). WBL promotes active and experiential learning by immersing students in actual work environments, fostering problem-solving abilities, adaptability, and lifelong learning attitudes (Wilson et al., 1997). WBL has been widely recognized as an effective strategy in TVET, particularly for engineering and technology-based disciplines, as it ensures graduates are not only academically competent but also workplace-ready(Stone, 1994).

At FTKE, WBL is embedded in the BELS program as a block release, where students complete the program over 3.5 years. The first 2.5 years are spent on campus, focusing on fundamental technical knowledge, practical skills, and hands-on training in university laboratories. In the final year, students undergo WBL in industry for one full year, which consists of two long semesters and one short semester in approved WBL companies. This program is designed to equip students with Level 6 (MQF) qualifications, providing a clear academic and career progression pathway especially for graduates of the Diploma of Vocational Malaysia (DVM) from Vocational Colleges.

To ensure the successful and structured implementation of WBL, Memorandums of Understanding (MoUs) are highly encouraged between the university and industry partners. These agreements establish clear roles, responsibilities, and commitments for both parties, ensuring that students receive comprehensive training, mentorship, and assessment throughout their industrial placement. This strong industry-academia partnership not only enhances graduate employability but also addresses Malaysia's skilled labor shortages, making TVET graduates more competitive in the job market while strengthening long-term collaboration between educational institutions and industries.

While Outcome-Based Education (OBE) frameworks such as iPO attainment provide structured learning outcomes, they do not fully measure a graduate's employability, workplace integration, or industry expectations. Exit surveys serve as a critical evaluation tool by offering direct insights into student perceptions of their competency development, career prospects, and alignment with industry requirements. This study utilizes exit survey data to assess how effectively WBL prepares BELS students for the workforce, providing empirical evidence on employment outcomes, competency attainment, and areas for improvement.

This chapter aims to evaluate student perceptions of their learning experiences in the Work-Based Learning (WBL) model, focusing on how well it prepares them for industry demands. It analyzes key findings from the exit survey, particularly in employment rates, competency levels, and industry expectations. Based on these findings, this chapter proposes recommendations to improve WBL implementation in the BELS program, ensuring better alignment with industry needs, accreditation standards, and student career readiness.

LITERATURE REVIEW

2.1 Work-Based Learning in TVET

Work-Based Learning (WBL) is an educational strategy that integrates theoretical instruction with industry-based practical training, ensuring that students gain real-world competencies required by employers (Becker, 2007). WBL has been widely recognized as a key approach in bridging the gap between education and employment, as it allows students to apply their academic knowledge in actual workplace settings, fostering better skill retention, problem-solving abilities, and industry adaptability (Lemanski et al., 2011).

In Malaysia, TVET education has been undergoing transformation to align with global trends by incorporating WBL into university programs, such as the BELS program at UTeM. This initiative is part of a broader effort to enhance student competencies in electrical maintenance, system diagnostics, and technology integration, while meeting national qualification standards, such as those set by the Malaysia Board of Technologists (MBOT). The BELS program has received Full Accreditation from MBOT for six years, from 2024 to 2029.

While exit surveys are commonly used in higher education to assess graduate employability, their implementation in Malaysian TVET institutions remains inconsistent. Few studies have examined how exit surveys can be leveraged to enhance WBL Level 6 program effectiveness, particularly in aligning TVET outcomes with national accreditation standards such as TTAC MBOT.

2.2 WBL Implementation at UTeM: The BELS Program Structure

The BELS is delivered in industry mode, requiring students to complete 122 graduation credits, of which 30 credits (24.59%) are allocated to WBL courses through a block release structure. UTeM has carefully designed its WBL framework within the BELS curriculum. To support the effective implementation of WBL, UTeM has developed the "Peraturan dan Garis Panduan Pelaksanaan Pembelajaran Berasaskan Kerja (Work-Based Learning, WBL)"(Universiti Teknikal Malaysia Melaka (UTeM), 2022), which outlines student placement procedures, industry collaboration requirements, assessment methods, and faculty supervision roles. These guidelines ensure that WBL implementation meets national accreditation standards and prepares students to be industry-ready upon graduation. The successful implementation of WBL at UTeM involves the participation of four key stakeholders:

1. WBL Companies – Organizations that provide industrial training placements, assign tasks, and evaluate student performance.

2. Industrial Coordinator & Coaches – Coordinate and supervisors at the WBL companies who mentor students and assess their competencies.

3. Faculty Instructors (Tenaga Pengajar Fakulti) – Academic staff responsible for overseeing student learning outcomes, providing guidance, and evaluating reports.

4. WBL Students – Final-year students undertaking industry-based training as part of their academic curriculum.

The program follows the 2u2i educational model, as outlined in the 2u2i Manual(Malaysian Qualifications Agency, 2020), TTAC Manual (TVET Sector)(Technology & Council, 2023) and the WBL Implementation Guidelines of UTeM(Universiti Teknikal Malaysia Melaka (UTeM), 2022), ensuring that students undergo 2.5 years of academic learning in the university followed by one full year (52 weeks) of structured industrial training.

The assessment structure follows the Effective Learning Time (ELT) framework, which ensures that Student Learning Time (SLT) is appropriately calculated based on industry engagement and experiential learning activities.

A key feature of WBL assessment at UTeM is that it is 100% based on individual performance—no group-based assessments are allowed. This ensures that each student is evaluated based on their personal achievements, technical competency, and professional development rather than collective project outcomes.

For the Final Year Project (FYP I & II), students must undertake projects directly related to their industrial placement, ensuring that their research and problem-solving efforts align with real-world industry challenges. This industry-driven project component enhances innovation, critical thinking, and hands-on application of engineering principles, bridging the gap between academic knowledge and industry expectations.

During WBL, students are required to complete five key courses that contribute to their competency development and technical expertise:

1. BELS 3664 – Maintenance Management System (MMS)
2. BELS 3674 – Project Planning and Execution
3. BELS 3684 – Final Year Project I (FYP I)
4. BELS 3696 – Final Year Project II (FYP II)
5. BELP 41112 – Industrial Training

The WBL program at FTKE is closely monitored by the Faculty Work-Based Learning Committee (JK WBL FTKE) to ensure effective implementation. Students are placed in pre-approved WBL companies through a formal Memorandum of Understanding (MoU) between UTeM and the industry partner, outlining roles, responsibilities, and assessment criteria. Students must remain in the same company throughout the entire 52-

week training period, as switching companies is not allowed to maintain continuity and commitment to the learning process.

Each student is assigned an Industrial Coach, who is a designated mentor at the WBL company responsible for guiding, evaluating, and providing feedback on the student's performance. Before the commencement of WBL, briefings and training sessions are conducted to ensure that Industrial Coaches understand the program structure, learning outcomes, and assessment methods.

In addition, Faculty Supervisors (Tenaga Pengajar Fakulti, TPF) conduct four scheduled visits throughout the WBL period to evaluate student progress, resolve challenges, and ensure that learning objectives are met. These visits also provide an opportunity for direct engagement between UTeM faculty, students, and industry mentors, ensuring a seamless connection between academic and industrial learning.

2.3 Program Educational Objectives (PEO) and Program Learning Outcomes (PLO) of BELS

PEOs are broad statements that describe what graduates will ultimately become in their careers after graduation. PEOs should align with the vision and mission of the UTeM. The BELS program is designed based on three key Program Educational Objectives (PEOs):

1. PEO1 – Produce graduates with technological and engineering skills relevant to electrical maintenance systems.
2. PEO2 – Develop graduates with professionalism and ethical values who can contribute effectively to society.
3. PEO3 – Equip graduates with lifelong learning skills and entrepreneurial mindset, enabling them to adapt to evolving industry demands.

PLOs statements is a graduate attribute (GA) to describe the abilities that students should portray upon accomplishment of the program, which covers the knowledge and attitudes that the future technologist will achieve after going through the respective program(Technology & Council, 2023). KPI for all PLOs is set at a target of minimal intended targets of students' competencies to perform 65% students achieving at least 40% marks or above. Table 1 provides a comprehensive list of nine PLOs for the BELS program.

Table 1: PLOs for BELS program.

PLO	Description
PLO1	Apply knowledge of technology fundamentals to broadly defined electrical maintenance systems.
PLO2	Suggest and apply the latest tools and techniques to solve technical problems.
PLO3	Demonstrate strong analytical and critical thinking skills in electrical maintenance.
PLO4	Communicate and articulate ideas effectively in both verbal and written forms.
PLO5	Demonstrate understanding of societal and environmental responsibilities in technology practices.
PLO6	Recognize the need for professional development and engage in lifelong learning.
PLO7	Develop awareness of management and technopreneurship practices.
PLO8	Exhibit professionalism, ethical responsibility, and social awareness.
PLO9	Demonstrate leadership qualities and teamwork in diverse environments.

2.4 Previous Studies on WBL Effectiveness

Research on WBL effectiveness has consistently shown that structured industry engagement significantly enhances graduate employability. (Lemanski et al., 2011) found that students who underwent structured WBL experiences exhibited greater competency in technical problem-solving, communication, and teamwork, which

are essential for workplace success. Similarly, (Otala, 1994) emphasized the importance of institutional-industry collaboration, highlighting that stronger academic-industry partnerships lead to more relevant and impactful learning experiences.

However, most studies focus on the direct impact of WBL on technical skill development without thoroughly examining how students perceive their own preparedness for the workforce. This is where the exit survey becomes crucial—it provides empirical data on student confidence, perceived skill acquisition, and employment outcomes, offering valuable insights that go beyond standard Outcome-Based Education (OBE) iPO attainment measurements.

2.5 The Need for Comprehensive Exit Surveys in WBL

While WBL is widely acknowledged as an effective pedagogical approach, its success is often measured through academic assessments and employer feedback. However, these methods may not fully capture students' self-perceived readiness and industry engagement levels. The exit survey plays a pivotal role in filling this gap by providing a direct student perspective on WBL effectiveness, specifically in areas such as:

- Employment outcomes – Tracking job offers, salary expectations, and career preferences.
- Self-assessment of PLOs – Understanding how confident students feel about applying their knowledge in real-world scenarios.
- Effectiveness of industry training – Identifying strengths and weaknesses in workplace learning experiences.

Furthermore, the exit survey serves as a data-driven tool for continuous curriculum enhancement, enabling institutions to:

- Identify areas of improvement in course content and industry collaboration.
- Strengthen alignment with curriculum structure and PLOs statements.
- Improve student employability strategies, ensuring better job placement outcomes.

2.6 Identified Research Gaps

Despite the well-documented benefits of WBL, existing literature lacks a comprehensive evaluation of student experiences in Malaysian TVET institutions. Most studies focus on employer perspectives or academic performance metrics, but do not consider students' self-perceived readiness for employment. Additionally, there is limited research on how WBL aligns with national accreditation frameworks such as TTAC MBOT.

This study seeks to bridge these gaps by:

1. Analyzing the exit survey results to assess how WBL impacts student competencies.
2. Evaluating the students' self-assessment and individual perceptions of their learning experiences.
3. Evaluating the effectiveness of industry collaboration by considering the overall WBL implementation.

METHODOLOGY

3.1 Research Design

This study employs a mixed-methods approach, combining quantitative survey data with qualitative insights from student feedback. The Exit Survey provides an indirect measurement of PLO attainment by capturing students' self-assessment and individual perceptions of their learning experiences. The objectives of the survey are to measure students' employment outcomes after completing the WBL program and to determine students' perceived achievement of knowledge, the effectiveness of the curriculum, and practical experiences related to the Program Learning Outcomes (PLOs).

The exit survey targeted 29 final-year students, representing the full cohort enrolled in the WBL program for the

academic year. The selection of 18 companies provides a diverse industry perspective, ranging from multinational corporations to SMEs in the electrical maintenance sector. However, further studies with larger sample sizes could provide a more comprehensive analysis of industry-specific employment trends.

3.2 Data Collection Methods

The exit survey was administered via Google Forms between February 12 and February 17, 2025, targeting 29 final-year students enrolled in the BELS program. This survey served as an indirect assessment tool to evaluate students' self-perceived competencies and employment readiness after completing the WBL program. The survey captured both quantitative and qualitative data to provide insights into students' career outcomes and their reflections on the effectiveness of the WBL curriculum in enhancing their professional skills.

The survey was structured into two main sections. Section A focused on employment outcomes, including job offers, salary ranges, and industry placement details. This section provided critical data on the immediate employability of graduates following their WBL experience.

Section B evaluated students' self-assessment of Program Learning Outcomes (PLOs) using a Likert scale (1–5), measuring their perceived competency in various technical and professional domains. Each PLO assessment consisted of three key questions to evaluate different aspects of student learning and competency development:

i. Theory Knowledge – How well students understand the theoretical concepts related to the PLO.
ii. Curriculum Effectiveness – How effective the curriculum was in teaching the knowledge or skills associated with the PLO.
iii. Practical Experience – How confident students feel in applying the knowledge or skills in real-world scenarios.

The results from this survey were analyzed against predefined Key Performance Indicators (KPIs) to determine whether the WBL program effectively met its intended learning objectives. This structured evaluation approach provides insights into students' learning experiences, highlighting strengths and areas for improvement within the BELS curriculum and industry training framework.

3.3 Data Analysis Techniques

To analyze the employment trends among graduates, descriptive statistics were applied to summarize key findings from the exit survey. This approach provided a clear overview of job placement rates, salary distributions, and industry engagement levels. By categorizing employment outcomes—such as the percentage of students receiving job offers, those still awaiting responses, and those opting for alternative career paths—the study offered a data-driven perspective on the effectiveness of WBL in facilitating graduate employability.

In addition to employment analysis, a comparative approach was used to evaluate student achievement in PLOs against predefined KPIs. Each PLO was assessed based on student self-ratings using a Likert scale, and the results were compared to the target benchmark of 65% student achievement at a minimum threshold of 40% marks or above. This method allowed for an objective evaluation of strengths and weaknesses within the curriculum, identifying areas where additional instructional support or program enhancements may be needed.

FINDINGS AND DISCUSSION

4.1.1 Employment Outcomes

The exit survey results indicated that 15 out of 29 students (51.7%) received job offers from their respective WBL companies. However, only 3 students (10.3%) officially accepted employment with their host companies, while the remaining 12 were either considering other opportunities or awaiting confirmation. In terms of financial compensation during the WBL program, 55% of students received a monthly allowance between RM801–RM1000, highlighting that most companies provided moderate financial support. Despite these positive employment outcomes, 6 students (20.7%) did not receive any job offers, while 4 students (13.8%) explicitly

stated that they were not interested in continuing employment with their WBL companies. These findings suggest that while WBL facilitates employment opportunities, certain factors—such as job satisfaction, alignment with career aspirations, or alternative employment prospects—may influence students' decisions regarding job acceptance.

Table 2 shows the distribution of WBL students across 18 companies. The largest host company was Sarawak Energy Berhad, which accommodated 4 students, while several companies hosted only one student each. This data suggests diverse industry participation, providing students with varied learning experiences and exposure to different work environments.

Table 2: WBL Company and WBL Students

No	WBL Company	No of Students
1	Addeen Engineering Sdn Bhd	1
2	Willowglen (Malaysia) Sdn Bhd	1
3	MKM Power Tech Sdn Bhd	1
4	Cohu Malaysia Sdn Bhd	1
5	MTU Services (Malaysia) Sdn Bhd	1
6	Infinity Power M&E Sdn Bhd	1
7	Permodalan Nasional Berhad	1
8	EITA Resources Berhad	1
9	Simosynergy Sdn Bhd	1
10	Cheng Hua Engineering Works Sdn Bhd	1
11	Stagno Tech Sdn Bhd	1
12	JET Engineering Solutions Sdn Bhd	2
13	Global Permai Sdn Bhd	2
14	IFFCO(Malaysia) Sdn Bhd	2
15	Brownfield Engineering Sdn Bhd	2
16	Nestle Chembong Factory	3
17	LED Vision Sdn Bhd	3
18	Sarawak Energy Berhad	4
	Total	**29**

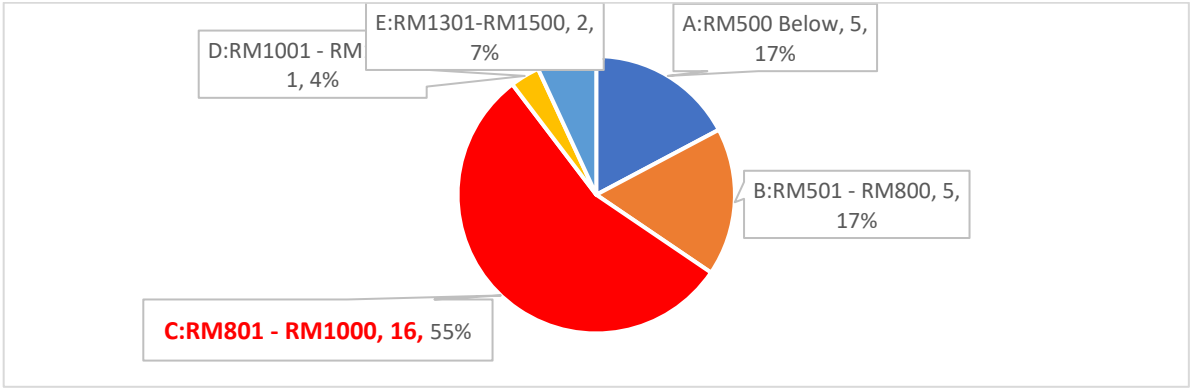


Figure 1: Student Allowance rate

Figure 1 illustrates the distribution of student allowances during WBL. The most common allowance range (RM801–RM1000) was received by 16 students (55%), while 5 students (17%) received below RM500 or between RM501–RM800. A small number of students (7%) received higher allowances (RM1301–RM1500), indicating disparities in financial support provided by different companies.

4.1.2 Student Self-Rating on PLOs

The self-assessment results for PLOs revealed that student achievement levels exceeded the predefined KPI of 65%, demonstrating strong confidence in their skill development through WBL. The highest-rated competencies were PLO8 (Professionalism) and PLO2 (Technology Application), indicating that students felt well-prepared in terms of workplace ethics, industry standards, and technical proficiency. However, PLO7 (Management and Technopreneurship) received the lowest rating, suggesting a potential gap in business-related skills within the curriculum. This finding underscores the need to strengthen WBL by incorporating more structured learning experiences in management, entrepreneurship, and leadership to better equip students for industry demands.

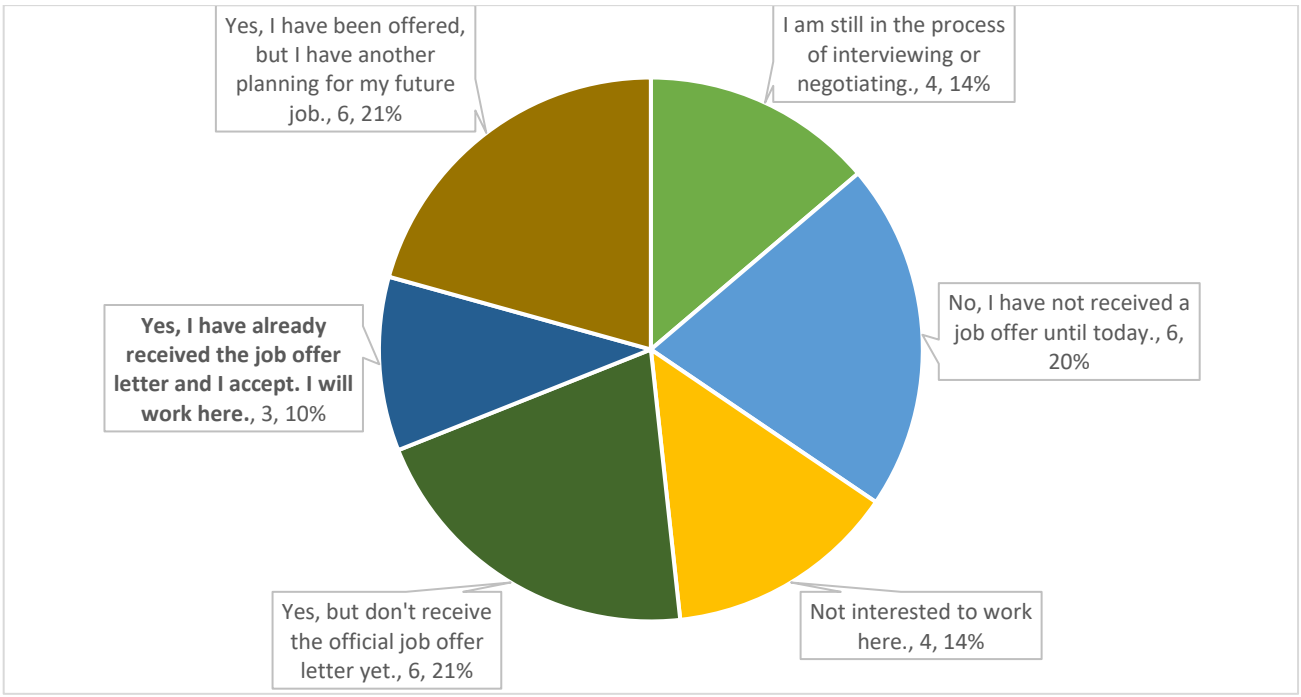


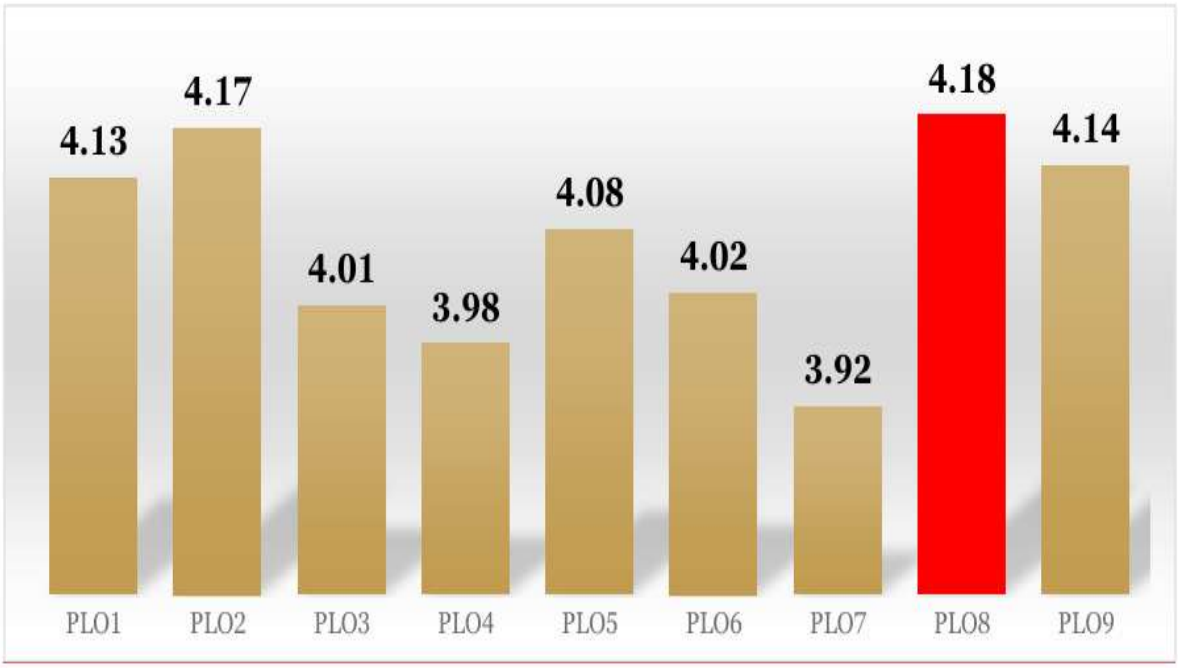
Figure 2: Student Employment after WBL

Figure 2 categorizes students' employment status after completing WBL. The largest group (21%) had received job offers but were awaiting official letters, while another 21% had been offered jobs but planned to pursue different career paths. Meanwhile, 20% had not received job offers, and 14% were not interested in working with their WBL companies. These insights suggest the need for stronger employer-student engagement strategies to improve employment transition rates.

DISCUSSION

The findings from the exit survey, the high self-ratings on technical skills (PLO2) and professionalism (PLO8) suggest that WBL provides students with valuable hands-on experience and industry exposure, which are critical for workforce readiness. Additionally, the employment outcomes indicate that a significant proportion of students secured job offers, further validating WBL as a practical approach to bridging the gap between education and industry expectations.

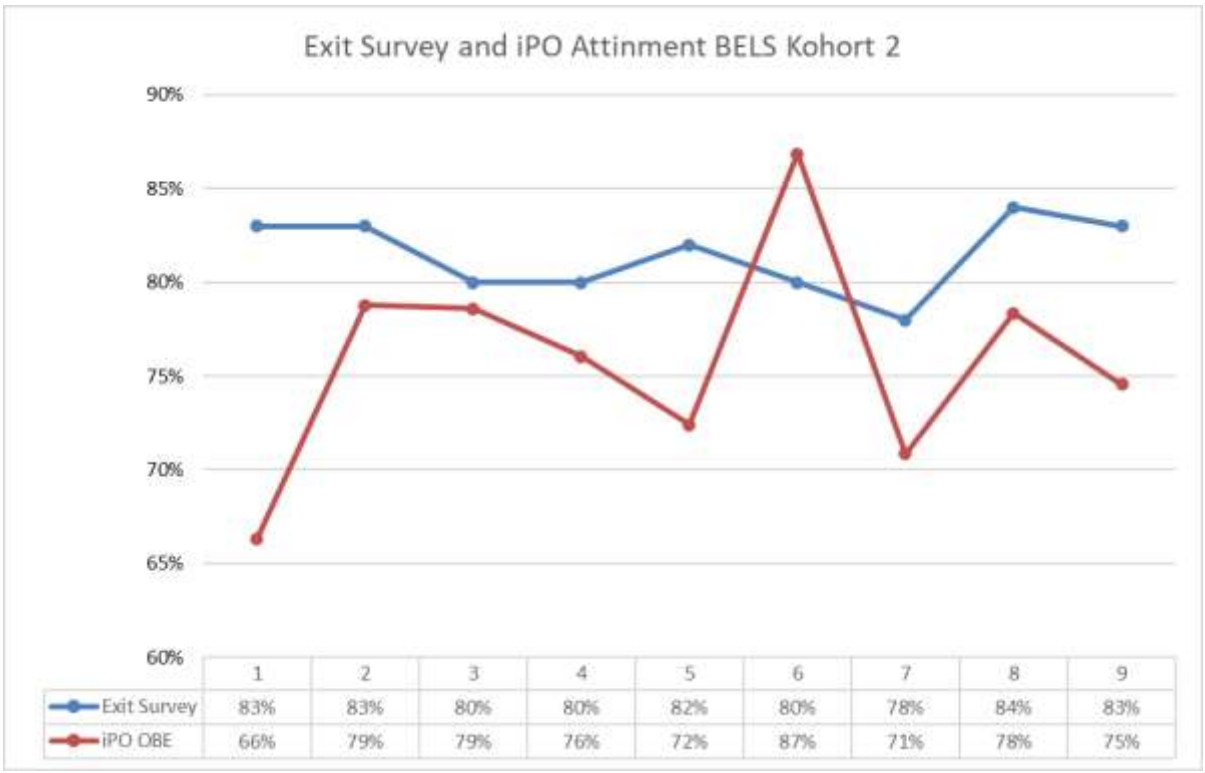
However, the disparity in employer engagement presents key areas for policy and pedagogical improvements. The lower rating of PLO7 (Management and Technopreneurship) highlights a gap in the curriculum, suggesting that students may require additional training in business acumen, leadership, and entrepreneurship to enhance their career prospects.



PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
4.13	4.17	4.01	3.98	4.08	4.02	3.92	4.18	4.14
83%	83%	80%	80%	82%	80%	78%	84%	83%

Figure 3: Student Self-Ratings for PLO Achievement

Figure 3 presents the average ratings for each PLO, showing that PLO8 (Professionalism) and PLO2 (Technology Application) scored highest (above 4.15 out of 5), while PLO7 (Management and Technopreneurship) scored the lowest (3.92). This data confirms that while technical and ethical competencies are well-developed through WBL, business and managerial aspects need improvement.



	1	2	3	4	5	6	7	8	9
Exit Survey	83%	83%	80%	80%	82%	80%	78%	84%	83%
iPO OBE	66%	79%	79%	76%	72%	87%	71%	78%	75%

Figure 4: PO Attainment Based on Exit Survey and SMP OBE System

Figure 4 illustrates the comparison between Exit Survey results and iPO attainment from the SMP OBE system for BELS Cohort 2. The Exit Survey consistently shows a higher percentage across all POs, ranging from 78% to 84%, indicating that students perceive themselves as well-prepared for industry requirements. In contrast, the iPO OBE results fluctuate more significantly, starting at 66% and peaking at 87% for PO6, before declining to 75% for PO9. The divergence between the two assessments suggests a gap between students' self-assessed competencies and their actual performance measured by the university's OBE system. The highest discrepancy is observed in PO1 and PO6, where student perceptions exceed system-recorded outcomes, indicating potential overestimation of their skills or limitations in the assessment methodology. Conversely, PO8 shows a closer alignment between both measurements, suggesting stronger consistency in evaluation. This comparison highlights the need for a more integrated evaluation approach, ensuring that student self-assessments align more accurately with institutional outcome-based assessments to improve curriculum effectiveness and graduate readiness.

The variation in job offer rates across students indicates that while WBL facilitates employment, factors such as company involvement, student performance, and industry demand play crucial roles in shaping post-graduation opportunities. Addressing these challenges through stronger industry collaboration, refined curriculum integration, and mentorship programs could further optimize the impact of WBL in TVET.

The findings from the exit survey align with previous research, reaffirming WBL's effectiveness in TVET education. However, the variation in employer engagement and job offer rates highlights areas for policy and pedagogical improvements. The disparity in student ratings for PLO7 (Management and Technopreneurship) suggests that additional training in business management, leadership, and entrepreneurship is necessary.

Students who received lower allowances or no job offers may have faced challenges related to company policies, work expectations, or skill alignment. Strengthening industry collaboration and structured mentorship programs can further optimize WBL outcomes, ensuring that students receive more consistent support and employment opportunities.

4.3 PLO Achievement Summary

To assess how well the BELS program met its educational objectives, three key aspects of learning were measured:

i. Theory Knowledge – How well students understood theoretical concepts.
ii. Curriculum Effectiveness – How effective the curriculum was in delivering relevant skills.
iii. Practical Experience – How confident students felt in applying knowledge in workplace settings.

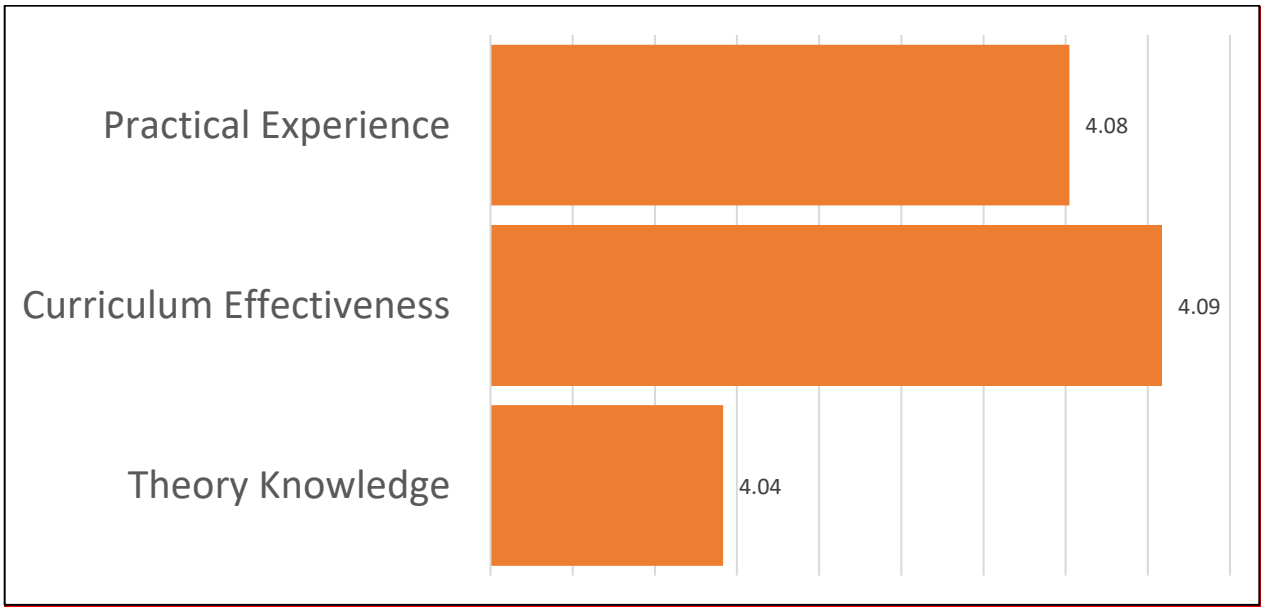


Figure 5: LO Achievement Summary based on practical, curriculum effectiveness and theory

Figure 5 compares student ratings across three dimensions based on individual perceptions of their learning experiences. The average ratings were:

- Theory Knowledge: 4.04
- Curriculum Effectiveness: 4.09
- Practical Experience: 4.08

These findings indicate that while students are generally satisfied with their theoretical and hands-on learning, there is room for improvement in curriculum effectiveness, particularly in management and entrepreneurship aspects.

Impact And Implications

5.1 Implications for TVET Policy and Practice

The findings of this study offer significant insights into the policy and practical implications for TVET education, particularly in the context of WBL. One of the key areas that require attention is curriculum enhancement, specifically in the integration of management and entrepreneurial skills. The low rating of PLO7 (Management and Technopreneurship) suggests that students may not be receiving adequate exposure to business-related competencies. To ensure that TVET graduates are well-equipped for both employment and self-employment opportunities, there is a need to incorporate more structured learning experiences in business management, leadership, and entrepreneurship within WBL programs.

Another critical implication is the need for stronger industry collaboration to enhance employer-student engagement. While WBL provides students with valuable workplace exposure, the variation in job offer rates and the number of students declining employment from their WBL companies indicate that not all industry placements are equally effective in fostering long-term career opportunities. Strengthening partnerships between TVET institutions and industry stakeholders through structured engagement initiatives, such as co-developed training modules and internship-to-employment transition programs, can help improve employment outcomes and ensure that students gain relevant skills aligned with market demands.

5.2 Recommendations for Teaching Innovations

To address the identified challenges, several teaching innovations can be implemented to further enhance the effectiveness of WBL in TVET. One of the key recommendations is the integration of business modules within the curriculum. By incorporating management, financial literacy, and entrepreneurship coursework, TVET institutions can help bridge the gap identified in PLO7, equipping students with the skills necessary to take on leadership roles or start their own ventures. This can be achieved through guest lectures by industry professionals, case studies on business operations, and practical entrepreneurship projects as part of WBL training.

Additionally, structured mentorship programs should be introduced to enhance student-industry interaction during WBL. By assigning each student an industry mentor, institutions can ensure that students receive personalized guidance, career insights, and skill development opportunities beyond their immediate job responsibilities. Regular feedback sessions, progress assessments, and networking events can further strengthen industry collaboration, ultimately leading to better employment transitions and higher levels of job satisfaction among graduates.

CONCLUSION AND RECOMMENDATIONS

6.1 Summary of Key Findings

The findings from the exit survey provide strong evidence of the positive impact of WBL on TVET student competencies and employability. Most students reported high levels of confidence in their technical skills and professionalism (PLO2 and PLO8), indicating that WBL effectively bridges the gap between academic learning

and industry requirements. Moreover, more than half of the students (15 out of 29) received job offers, reflecting the program's role in enhancing workforce readiness.

However, despite these successes, the data also highlight gaps in business acumen and industry connections. The low rating of PLO7 (Management and Technopreneurship) suggests that students may require additional exposure to business-related competencies to improve their adaptability in dynamic work environments. Additionally, variations in employment outcomes indicate that industry engagement in WBL could be further optimized to ensure smoother transitions from education to employment. Addressing these areas through curriculum enhancements and stronger employer-student collaborations will be critical in maximizing the benefits of WBL in TVET education.

A fair and reasonable allowance for students undergoing one year of Work-Based Learning (WBL) in the industry should reflect both the cost of living and the value of their contributions to the company. Based on the exit survey findings, most students received an allowance ranging between RM801–RM1000 per month, while a smaller percentage received above RM1000. Given the increasing cost of living in Malaysia and the fact that WBL students contribute effectively as entry-level technical trainees, a minimum allowance of RM1000–RM1200 per month would be a more equitable range. This ensures that students can cover essential expenses such as accommodation, food, and transportation, while also incentivizing industry participation in nurturing skilled TVET graduates. Companies that offer higher allowances (RM1300–RM1500) demonstrate stronger commitment towards talent development and should serve as a benchmark for future WBL implementation in Malaysia.

6.2 Recommendations for Future Research

To further enhance the understanding and effectiveness of WBL in TVET, future research should focus on longitudinal studies tracking the employment trends of WBL graduates over an extended period. By following cohorts beyond their immediate post-graduation phase, researchers can assess long-term career progression, skill utilization, and the sustainability of WBL-acquired competencies in the workforce. This approach will provide deeper insights into how well WBL prepares students for career mobility, industry demands, and economic changes.

Additionally, comparative studies on different WBL models across TVET institutions would be valuable in identifying best practices and areas for improvement. As WBL structures vary by institution, sector, and country, analyzing different implementations can reveal which models yield the highest employment rates, skill retention, and employer satisfaction. Such studies can inform policy recommendations, curriculum refinements, and industry engagement strategies, ultimately contributing to a more effective and scalable WBL framework in TVET education.

To address gaps in business acumen (PLO7), the BELS curriculum should incorporate structured modules on business management and entrepreneurship, co-developed with industry partners. Additionally, accreditation bodies such as MBOT and MQA should consider integrating employer feedback from exit surveys into future TVET program evaluations.

This study is limited by its small sample size, reliance on a single institution, and dependence on student self-assessment, which may lead to overestimation of competencies. The absence of triangulated data from employers and faculty supervisors also restricts the accuracy of findings. To strengthen future research, larger multi-institutional surveys should be conducted, complemented by qualitative methods such as interviews or focus groups. Furthermore, the consistently lower rating of PLO7 suggests a need to embed structured modules on business management, entrepreneurship, and financial literacy into the WBL curriculum, supported by industry-driven mentorship programs to better prepare graduates for leadership and entrepreneurial roles.

ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to Fakulti Teknologi dan Kejuruteraan Elektrik (FTKE), Universiti Teknikal Malaysia Melaka (UTeM) for their support and resources in conducting this research. The

authors also acknowledge the contributions of students and colleagues whose insights and feedback greatly enhanced the quality of this work.

REFERENCES

1. Becker, K. (2007). Digital game-based learning once removed: Teaching teachers. British Journal of Educational Technology, 38(3), 478–488.
2. Lemanski, T., Mewis, R., & Overton, T. (2011). An introduction to work-based learning: A physical sciences practice guide. The Higher Education Academy.
3. Malaysian Qualifications Agency. (2016). GUIDELINES TO GOOD PRACTICES: WORK-BASED LEARNING.
4. Malaysian Qualifications Agency. (2020). Garis Panduan Pelaksanaan Mod Pengajian 2u2i.
5. Otala, L. (1994). Industry-university partnership: Implementing lifelong learning. Journal of European Industrial Training, 18(8), 10–17.
6. Sekretariat Majlis TVET Negara. (2024). Dasar TVET Negara 2030.
7. Stone, J. R. (1994). The role of work-based learning in the transition from school to work. In School-to-work systems: The role of community colleges (pp. 23–38). Jossey-Bass.
8. Technology, & Council, T. A. (2023). TTAC Standard Second Edition (TVET Sector).
9. Universiti Teknikal Malaysia Melaka (UTeM). (2022). Peraturan dan garis panduan pelaksanaan pembelajaran berasaskan kerja (Work-Based Learning, WBL) (2nd ed.). Universiti Teknikal Malaysia Melaka.
10. Wilson, J., Stull, W., & Vinsonhaler, J. (1997). Constructivist learning theory and student motivation. In Handbook of academic learning: Construction of knowledge (pp. 173–198). Academic Press.

AUTHOR BIO

Ts. Dr. Sulaiman bin Sabikan is the Head of Programme for the Bachelor of Technology in Electrical Maintenance System (BELS) at Universiti Teknikal Malaysia Melaka (UTeM). He holds a Ph.D. in Electrical Engineering from Universiti Teknologi Malaysia (UTM), specializing in unmanned aerial vehicle (UAV) control systems. With over 20 years of experience in engineering education and research, he has dedicated four years to teaching and developing Level 6 Technology programs, focusing on TVET curriculum design, Work-Based Learning (WBL) implementation, and competency-based education. His expertise spans mechatronics, mobile robotics, and industrial automation, and he has led multiple industry-driven research projects. As a Professional Technologist (MBOT) and a member of BEM, Dr. Sulaiman actively collaborates with industry partners to enhance student employability and bridge the gap between academic learning and real-world applications. His commitment to TVET education and technological innovation ensures that graduates are well-equipped for the evolving job market.