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PROGRAM EDUCATIONAL OBJECTIVES ACHIEVEMENT ON EMPLOYABILITY OUTCOMES IN CIVIL ENGINEERING DIPLOMA PROGRAMS: A SURVEY-BASED INVESTIGATION

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Abstract:

This study investigates the relationship between program educational objectives (PEOs) and the employability outcomes of civil engineering diploma graduates from one of the higher learning institutions in Malaysia. A survey-based investigation was employed, incorporating survey data from alumni of a civil engineering diploma program. The study aimed to evaluate the alignment of the program's PEOs with industry needs and assess their effectiveness in preparing graduates for successful careers. Results revealed a comprehensive understanding of the complex relationship between PEOs and positive employability outcomes such as job satisfaction and career advancement opportunities. The findings offer valuable insights for educators and policymakers seeking to enhance the employability of civil engineering diploma graduates through targeted curriculum development and continuous assessment.

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Keywords:

Civil Engineering Diploma, Program Educational Objectives (PEOs), Graduate Employability, Alumni Survey, Industry Needs

Introduction

The Malaysian construction industry is a vital driver of the national economy, fuelled by robust infrastructure development and urbanization. Major projects like the Pan Borneo Highway, ECRL, and MRT lines are creating high demand for civil engineers with expertise in transportation, structural, and geotechnical engineering. The industry is also embracing sustainability and technology, with trends like green building certifications, BIM, and digital twins becoming increasingly important. The increasing adoption of digital technologies in the Malaysian construction industry, such as BIM and digital twins, necessitates the development of new skillsets among civil engineering graduates. A recent study by Lee and Rahman (2024) compared the impact of digital technologies on employability skills in Malaysia and Singapore, highlighting the growing demand for graduates with expertise in these areas.

This rapidly evolving environment requires civil engineering graduates to possess not only strong technical skills but also practical abilities, interpersonal skills, and professional attributes to thrive. However, the industry faces challenges in meeting these evolving demands, including incorporating technology and sustainable practices, while addressing skills gaps and labour shortages. The emphasis on sustainability in the Malaysian construction industry requires a corresponding shift in educational approaches. Ismail and Yusof (2024), in their study presented at the International Conference on Civil Engineering Education, argued for the integration of sustainability and resilience concepts into PEOs to ensure graduates are equipped to address the challenges of sustainable development.

Program educational objectives (PEOs), as defined by accreditation bodies such as the Engineering Technology Accreditation Council (ETAC) and the Malaysian Qualifications Agency (MQA), provide a structured framework for guiding curriculum design and ensuring that graduates are well-prepared for successful careers. However, the challenge lies in aligning PEOs with the ever-evolving needs of the industry and the diverse perceptions of employability skills held by students, academics, and employers (Saim et al., 2020a). Research has illuminated the importance of understanding these varied perspectives to effectively bridge the gap between educational outcomes and workforce requirements (Knight & Yorke, 2004).

While technical competence remains undeniably crucial for civil engineers, studies have also underscored the significance of broader employability skills encompassing psychomotor and affective domains (Saim et al., 2020b). These domains encompass practical abilities, interpersonal skills, and professional attributes that collectively contribute to successful career outcomes. Furthermore, the impact of engineering education on graduate employability extends beyond technical skills, encompassing factors such as work experience, personality traits, and career aspirations (McQuaid & Lindsay, 2005).

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This survey-based investigation aims to build upon this existing body of knowledge by examining the relationship between PEO achievement and employability outcomes of civil engineering diploma graduates in Malaysia. By involving feedback from alumni, this research seeks to provide a comprehensive evaluation of the program's effectiveness in preparing graduates for the Malaysian workforce. The findings will offer valuable insights for educators, employers, and policymakers seeking to enhance the employability of civil engineering diploma graduates through targeted curriculum development, continuous assessment, and stronger industry engagement.

Literature Review

The concept of employability itself has been a subject of scholarly inquiry. McQuaid and Lindsay (2005) explored the multifaceted nature of employability, encompassing not only technical skills but also personal attributes, experiences, and the ability to adapt to changing labour market conditions. This broader understanding of employability underscores the need for educational programs to foster a holistic skillset in graduates. Knight and Yorke (2004) further emphasized the broader impact of engineering education on graduate employability, extending beyond technical skills to encompass work experience, personality traits, and career aspirations.

Recent studies have highlighted the significance of evaluating PEOs and their impact on graduate employability. Saim et al. (2020a) delved into the diverse perceptions of employability skills among students, academics, and industry professionals, emphasizing the need to bridge the gap between educational outcomes and workforce requirements. In a related study, Saim et al. (2020b) focused on the evaluation of psychomotor and affective domain outcomes for civil engineering diploma students through industrial training, highlighting the importance of these domains in shaping competent and adaptable professionals.

In the specific context of civil engineering diploma programs, research has examined the relationship between PEO achievement and various employability outcomes. A study by Haron & Hassan (2018) found that graduates who achieved PEOs related to technical competence, problem-solving, and communication skills were more likely to secure employment in their field and experience career advancement. This finding underscores the importance of developing a balanced skillset that encompasses both technical and soft skills, as reflected in the four PEOs for civil engineering technicians outlined earlier. For instance, PEO 1 and 2 ensure graduates possess strong technical competencies in core engineering principles and problem-solving, essential for performing key job functions. PEO 3 cultivates vital soft skills like teamwork and communication, enabling effective workplace collaboration. PEO 4 promotes advanced skills in leadership, information management, and entrepreneurial thinking, crucial for career advancement.

Further research has explored the specific skills that contribute to employability in engineering fields. Ng and Tan (2015) focused on the impact of soft skills on the employability of Malaysian engineering graduates. Their research underscores the importance of communication, teamwork, and problem-solving in securing employment and career advancement. Similarly, Li & Zhang (2022) investigated engineering graduates' employability skills and their perceived importance, shedding light on the relevance of technical competence, problem-solving, and communication skills in the job market. Othman & Hashim (2019) demonstrated the effectiveness of internship programs in enhancing employability skills,

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potentially highlighting the role of practical experience in securing employment and career advancement.

Methodology

This research employs a survey-based investigation, primarily focusing on the collection and analysis of quantitative data. A survey instrument was meticulously designed to gather information from alumni of a civil engineering diploma program. This approach allowed for the collection of numerical data related to both PEO achievement (e.g., self-assessed proficiency in technical skills, communication, problem-solving) and employability outcomes (e.g., current employment status, job satisfaction, salary level, career advancement). By analysing this data statistically, the study aimed to evaluate the alignment of the program's PEOs with industry needs and assess their effectiveness in preparing graduates for successful careers. In addition, the survey may have also explored whether graduates who reported higher levels of achievement in PEOs related to communication and teamwork also reported higher levels of job satisfaction or faster career progression. This focus on quantitative data within a mixed-methods approach allows for a deeper understanding of the relationships between variables, as Creswell and Plano Clark (2018) highlight the importance of quantitative data in providing "statistical evidence of correlations" within mixed-methods research. This quantitative approach provides valuable insights into the effectiveness of the program in equipping graduates with the skills and knowledge necessary to thrive in the Malaysian construction industry.

Results and Discussion

This study captures the employability outcomes of graduates who graduated with a Diploma in Civil Engineering in 2020 or earlier, including in 2019, 2018, and 2017. These respondents were entitled to provide feedback on the Program Educational Objectives for the Diploma in Civil Engineering Program since they had at least three years after receiving their diploma. However, this timeframe represents a specific snapshot in time. Longitudinal studies tracking graduates over a longer period would provide valuable insights into the long-term impact of PEO achievement on career success. In addition to this temporal limitation, there are other constraints to consider. A limitation of this study is the sample size, which may not fully represent the diversity of civil engineering diploma graduates across Malaysia. Furthermore, this study also relies on self-reported data, which may be subject to recall bias or social desirability bias. Future research could incorporate objective measures of PEO achievement and employability outcomes, such as employer evaluations or performance data. In addition, while this study examines the relationship between PEO achievement and employability outcomes, it is important to acknowledge the influence of other factors, such as economic conditions and individual characteristics, which may also contribute to graduate success.

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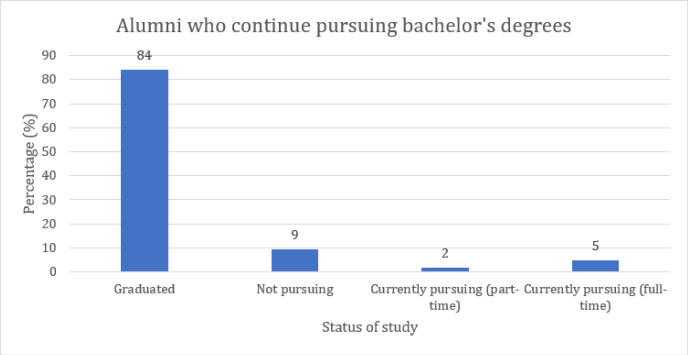

Figure 1: Alumni Pursuing a Bachelor's Degree

Figure 1 illustrates the percentage of alumni from a diploma program who are continuing their education by pursuing a bachelor's degree. The results are divided into four categories which are the alumni have already graduated with a bachelor's degree, the alumni are not currently pursuing a bachelor's degree, the alumni are currently pursuing a bachelor's degree on a part-time basis and a full-time basis. Overall, the result indicates a high rate of bachelor's degree attainment among alumni (84%), with a relatively small percentage still pursuing their studies (7%). This suggests that the diploma program may be effectively preparing students for further academic advancement. Some alumni are not pursuing a bachelor's degree due to various factors such as financial constraints, personal choices, or career opportunities that do not require a higher degree.

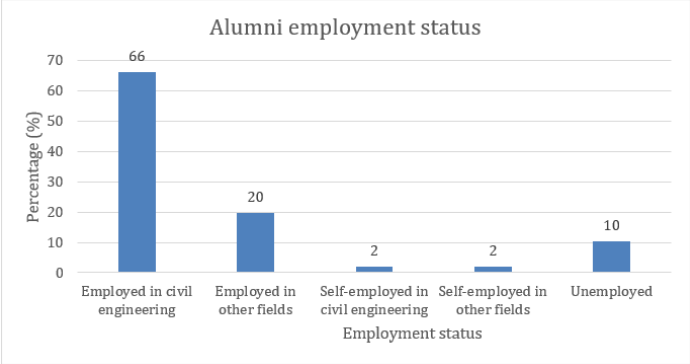

Figure 2: Employment Status of Alumni

Figure 2 illustrates the employment status of alumni from a particular program, likely a civil engineering diploma program. The results are presented as percentages across five categories which are employed in civil engineering, employed in other fields, self-employed in civil engineering, self-employed in other fields and unemployed. Most alumni (66%) are employed in the civil engineering field, indicating that the program is effectively preparing graduates for careers in their chosen profession. A significant portion of alumni (20%) are employed in fields outside of civil engineering. This suggests that the program's graduates possess transferable skills applicable to a broader range of industries. A small percentage of alumni (2%) are self-employed within the civil engineering field. This indicates some entrepreneurial spirit and the ability to create independent career paths. A similarly small percentage (2%) are self-employed in fields unrelated to civil engineering, further highlighting the versatile skillset of the program's graduates.

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Overall, the figure demonstrates a positive employment outlook for graduates of the program, with the majority finding employment in their field or leveraging their skills in other industries. About only 10% of alumni are currently unemployed. Wong and Lee (2020) identified several factors that affect the employability of engineering graduates in Malaysia such that graduates with higher academic achievements tend to have better employment prospects and practical experience gained through internships is highly valued by employers and enhances graduates' employability.

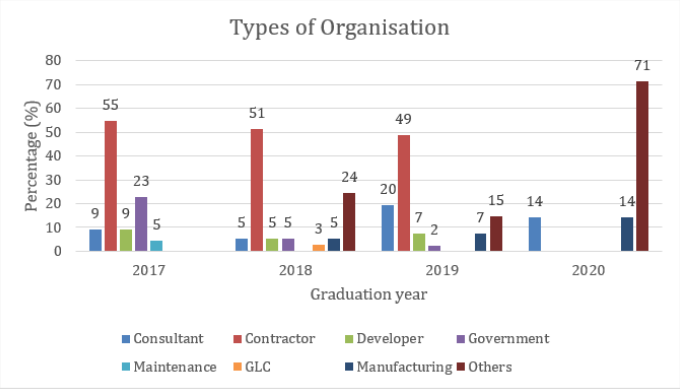

Figure 3: Types Of Organisations in Which Alumni are Involved

Figure 3 illustrates the employment distribution of graduates across various types of organizations from 2017 to 2020. The contractor sector consistently hired the largest percentage of graduates throughout the years, with figures ranging from 49% to 71%. This suggests a strong demand for graduates in construction and project management roles. The consultant sector experienced fluctuations, peaking in 2017 at 55% and declining to 14% in 2020. This could indicate a shifting demand for consultancy services within the industry. The remaining sectors (developer, government, maintenance, GLC, manufacturing, and others) generally employed smaller percentages of graduates, highlighting a preference for contractor and consultant roles among the alumni.

Overall, there's a noticeable shift in employment patterns over the years, with a decline in consultant roles and a significant increase in contractor roles, particularly in 2020. This could be attributed to various factors such as economic conditions, industry trends, or changes in the graduates' career preferences, not to mention the impact of the Malaysia Movement Control Order (MCO) period. Ali and Ahmad (2019) investigated that a combination of technical competence, soft skills, and personal attributes, along with work experience and career aspirations, may influence the career choices and success of civil engineering diploma graduates in Malaysia. For example, graduates with prior experience in the construction industry may be more likely to seek employment in the contractor sector, while those with an interest in design and planning may be drawn to the consultant sector. In conclusion, the data provides valuable insights into the employment landscape for graduates of this program, revealing a strong preference for contractor roles and a fluctuating demand for consultant positions.

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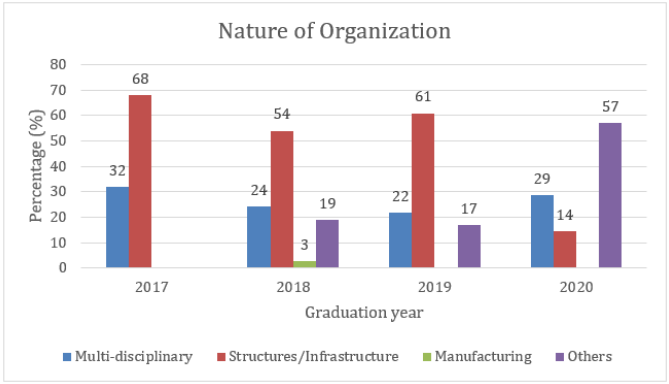

Figure 4: Nature of Organisations in Which Alumni are Involved

Figure 4 illustrates the distribution of employment of graduates from civil engineering diploma program across various types of organizations from 2017 to 2020. Structures/Infrastructure sector consistently employed the largest percentage of graduates throughout the years, ranging from 54% to 68%. This indicates a strong and steady demand for graduates in this field, likely in construction and infrastructure development roles. Employment in multi-disciplinary organizations fluctuated, peaking in 2017 at 32% and declining to 14% in 2020. This suggests a potential shift in industry trends or employer preferences. The others category saw a gradual increase in employment from 17% in 2017 to 29% in 2020, while the manufacturing sector remained relatively low, with a peak of 3% in 2018. This implies a diversified employment landscape for graduates outside of core civil engineering sectors. Overall, the data reveals a notable shift in employment patterns over the years, with a decrease in multi-disciplinary roles and a slight increase in "Others" category. However, employment in structures/infrastructure remained consistently high, underscoring the enduring demand for graduates in this sector. Moreover, this information provides valuable insights into the diverse employment opportunities available to graduates of this program. The dominance of the structures/infrastructure sector and the evolving trends in other sectors suggest a dynamic employment landscape that may require graduates to adapt and develop a broad skill set to remain competitive.

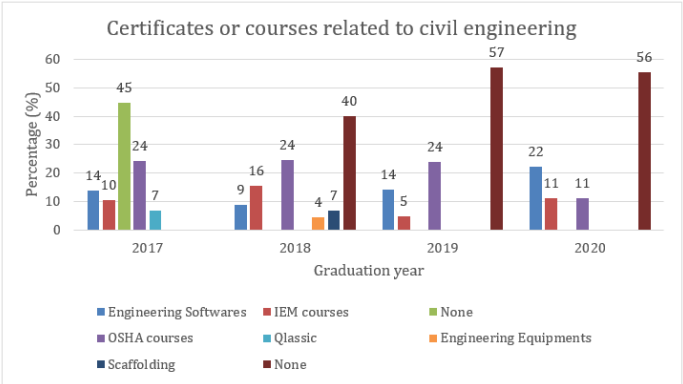

Figure 5: Certificate or Courses Related to Civil Engineering

Figure 5 illustrates the percentage of graduates from a civil engineering diploma program who have obtained various certificates or courses related to their field between 2017 and 2020. A significant proportion of graduates (ranging from 40% to 57%) reported not having any additional certifications or courses related to civil engineering during this period. This might

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indicate a potential gap in professional development or a lack of awareness regarding available opportunities for upskilling. The proportion of graduates with engineering software certifications remained relatively stable over the years (around 10%). This suggests a consistent level of interest in acquiring software skills relevant to the field.

The participation in IEM (Institution of Engineers Malaysia) courses showed a slight decline from 24% in 2017 to 11% in 2020. This could be attributed to various factors, such as cost, availability, or perceived relevance to career goals. The proportion of graduates with OSHA (Occupational Safety and Health Administration) courses fluctuated between 7% and 14%. This indicates a varying level of interest in safety training and compliance, which could be influenced by industry demand or individual career paths. Other certifications (i.e. Qlassic, Engineering Equipment, Scaffolding) category generally represented a small proportion of graduates, highlighting a limited uptake of specialized certifications.

In addition, the data reveals a diverse landscape of professional development among civil engineering diploma graduates. The significant proportion of graduates without additional certifications underscores the need for greater awareness and accessibility to relevant training opportunities. The study by Kamarudin and Zainuddin (2017) suggests that industrial training within the curriculum could be a valuable avenue for graduates to acquire the necessary skills and certifications, thereby improving their employability. Furthermore, Ismail and Rahman (2016) found that a mismatch exists between the academic preparation of Malaysian engineering graduates and the expectations of the industry. They suggest that professional development programs should be tailored to address this gap and better equip graduates for the workforce.

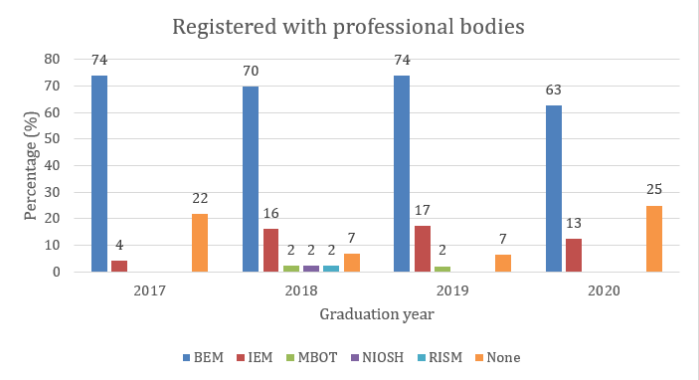

Figure 6: Distribution of Alumni Registered with Professional Bodies

Figure 6 illustrates the percentage of graduates who are registered with various professional bodies, tracked across their graduation years from 2017 to 2020. The percentage of civil engineering graduates who are registered with BEM is the highest, but the trend is declining over the years. This could be due to several factors, such as a decrease in the number of graduates who are interested in pursuing a career in engineering, or an increase in the number of graduates who are choosing to register with other professional bodies. However, the percentage of graduates who are registered with BEM is still relatively high, even though it has been declining.

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Registration with the Institution of Engineers Malaysia (IEM) is the second highest among the professional bodies shown, peaking at 22% in 2017 and gradually decreasing to 13% in 2020. This may reflect a decreasing interest among graduates in joining a voluntary professional organization that focuses on networking and professional development opportunities. Registration with other bodies like MBOT, NIOSH, and RISM remains consistently low (below 2%) across all years, indicating these bodies are not a primary focus for graduates of this program. The high percentage of graduates not registered with any professional body suggests a need for greater awareness and education about the benefits and importance of professional registration, both for individual career growth and the overall development of the engineering profession in Malaysia. In conclusion, the information highlights a concerning trend of low registration with professional bodies, particularly with BEM and IEM, among graduates of this program. The overall low numbers suggest a need for increased awareness and understanding of the benefits of professional registration for career advancement and professional development in the engineering field.

Conclusion

This research contributes to the ongoing discourse on the effectiveness of educational programs in preparing graduates for the workforce. The survey-based investigation employed in this study provides a comprehensive understanding of the complex relationship between PEOs and employability outcomes. The findings can inform evidence-based decision-making in curriculum development, assessment practices, and career guidance initiatives within civil engineering diploma programs. In addition, this study underscores the importance of continuous evaluation and improvement of educational programs to ensure their relevance and effectiveness in meeting the evolving needs of the industry. By fostering a strong connection between academia and industry, educational institutions can empower graduates with the skills and knowledge necessary to thrive in their chosen careers and contribute to the growth and development of the Malaysian construction industry. Ultimately, this study aims to provide valuable insights into how well the current curriculum aligns with industry needs and how effectively it equips graduates with the necessary skills to succeed in the evolving Malaysian construction landscape, thereby informing strategies to enhance the employability of future civil engineering graduates.

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References

Ali, A., & Ahmad, S. (2019). The impact of personality traits on the employability of engineering graduates in Malaysia. *International Journal of Engineering Education, 35*(1), 123-138.

Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). SAGE Publications.

Haron, R., & Hassan, R. (2018). Employability skills of civil engineering graduates in Malaysia: Employers' perspectives. *Journal of Engineering Science and Technology, 13*(7), 2065-2076.

Ismail, M., & Rahman, M. (2016). A study on the employability skills of Malaysian engineering graduates: A tracer study approach. *Procedia Economics and Finance, 35*, 213-221.

International Journal of Modern Education
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IJMOE
Volume 7 Issue 24 (March 2025) PP. 620-629
DOI: 10.35631/IJMOE.724043

Ismail, N., & Yusof, Z. M. (2024). Developing future-ready civil engineers: Integrating sustainability and resilience into PEOs. *Proceedings of the International Conference on Civil Engineering Education*, 112-119.

Kamarudin, N., & Zainuddin, Z. (2017). The role of industrial training in enhancing the employability skills of Malaysian engineering graduates. *Procedia Engineering*, *184*, 403-410.

Knight, P. T., & Yorke, M. (2004). The impact of engineering education on graduate employability. *European Journal of Engineering Education*, *29*(1), 3–16.

Lee, S. K., & Rahman, A. (2024). The impact of digital technologies on employability skills in the construction industry: A comparative study of Malaysia and Singapore. *Journal of Construction Engineering and Management*, *150*(12), 121-142.

Li, Y., & Zhang, L. (2022). A survey of engineering graduates' employability skills and their perception of the importance of these skills. *European Journal of Engineering Education*, *47*(2), 256-278.

McQuaid, R. W., & Lindsay, C. (2005). The concept of employability. *Urban Studies*, *42*(2), 197–219.

Ng, S. H., & Tan, K. H. (2015). The impact of soft skills on the employability of Malaysian engineering graduates. *Procedia - Social and Behavioral Sciences*, *172*, 824-831.

Othman, N., & Hashim, H. (2019). Evaluating the effectiveness of internship programs in enhancing the employability skills of civil engineering students in Malaysia. *Pertanika Journal of Social Sciences & Humanities*, *27*(2), 905-922.

Saim, N. A. M., Mohd Yusof, N. A., & Zakaria, E. (2020a). Engineering employability skills: Students, academics, and industry professionals' perception. In *IOP Conference Series: Materials Science and Engineering* (Vol. 995, No. 1, p. 012077). IOP Publishing. doi:10.1088/1757-899X/995/1/012077

Saim, N. A. M., Yusof, N. A. M., & Zakaria, E. (2020b). Evaluation of programme outcomes under the psychomotor and affective domain for diploma civil engineering students through industrial training: A statistical study from employers' perspective in Malaysia. In *IOP Conference Series: Materials Science and Engineering* (Vol. 995, No. 1, p. 012078). IOP Publishing. doi:10.1088/1757-899X/995/1/012078

Wong, P. C., & Lee, J. C. (2020). Factors affecting the employability of engineering graduates in Malaysia: A survey-based study. *Journal of Engineering Education Transformations*, *33*(2), 91-102.