

Employability Skills of Bachelor of Technology Students at UTHM for Future Industry Needs

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Abstract

This study investigates the employability skills of Bachelor of Technology students at Universiti Tun Hussein Onn Malaysia (UTHM) in meeting the needs of future industries, focusing on two key skills that was teamwork and problem-solving. In response to the increasing demand for graduates with both technical expertise and soft skills in the rapidly changing job market, this study aims to assess these skills among final-year technology students. A quantitative research methodology was used, with surveys as the data collection instrument. The findings show that although most students demonstrate good teamwork and problem-solving skills across various fields of study, there is variation in their ability to adapt to team dynamics and apply creative thinking in problem-solving. Crucially, a significant gender difference was observed in teamwork skills, while problem-solving skills showed no significant difference based on gender. The results suggest the need to strengthen curriculum development and skills training programs at UTHM, particularly by promoting interdisciplinary learning to better prepare students to be competitive in the dynamic job market. Recommendations include introducing more collaborative learning experiences to further enhance these skills.

1. Introduction

In this era of globalization and rapid technological advancement, future industries require graduates who are not only proficient in technical fields but also possess interpersonal skills such as teamwork and problem-solving. This need is becoming increasingly urgent due to the rapid technological changes and the competitive dynamics of the job market. According to a study by the Malaysian Employers Federation (MEF, 2024), the most critical skills required by industries are teamwork (94%) and problem-solving (92.5%). Therefore, universities need to ensure their graduates are equipped with appropriate employability skills, including both technical and interpersonal skills.

At Universiti Tun Hussein Onn Malaysia (UTHM), Bachelor of Technology students are expected to master both of these skills to meet the challenges of future industries. Teamwork refers to an individual's ability to work effectively within a team, communicate clearly, and understand group dynamics in a professional context (McGunagle & Zizka, 2020). This skill is crucial in the workplace, where most projects and tasks require team-based work. On the other hand, problem-solving involves identifying, analyzing, and resolving issues that arise in various complex situations (Baha et al., 2020). Problem-solving is one of the key skills sought by employers because it allows employees to address unforeseen challenges and find innovative and effective solutions. However, a critical empirical gap remains within the institutional context. While the broader need for these

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interpersonal competencies is well-established in the industry, there is currently a lack of specific empirical data on the exact proficiency levels of teamwork and problem-solving skills among final-year technology students at UTHM. Without this localized data, it is difficult to determine how academic contexts or demographic factors influence skill acquisition, making it challenging to design targeted interventions.

This study aims to fill this gap by assessing the level of teamwork and problem-solving skills among final-year Bachelor of Technology students at UTHM. Additionally, the study will explore factors influencing students' employability and determine the extent to which students are able to adapt to the ever-changing needs of future industries. The study uses a quantitative methodology with surveys as the data collection tool from final-year students in various technology programs at UTHM. The findings of this study are expected to provide recommendations for strengthening curriculum development and skills training programs at UTHM, particularly in promoting more collaborative and interdisciplinary learning experiences that can better prepare students to meet the increasingly complex and competitive demands of the future job market.

1.1 Problem Statement

In the era of rapid technological advancement, industries face dynamic changes that require a workforce with a balanced combination of technical and interpersonal skills. However, there are significant concerns regarding the employability of Bachelor of Technology graduates, particularly at Universiti Tun Hussein Onn Malaysia (UTHM), in meeting the needs of future industries. Studies indicate that graduates often struggle to establish productive work relationships. This weakness has a significant impact on sectors like information technology and manufacturing, where the ability to collaborate effectively is critical to project success. For instance, in the information technology industry, failures in communication and collaboration within development teams often lead to project delays and products that do not meet quality standards. In the manufacturing industry, the inability to work well with others can result in increased costs and production delays, negatively impacting overall organizational competitiveness.

Additionally, problem-solving skills among graduates have raised serious concerns. Graduates are frequently underprepared to face the complex, real-world challenges of the workforce, including the need to solve intricate technical problems innovatively and within limited timeframes. This deficiency negatively impacts organizational productivity, corporate reputation, and customer trust. For example, in the automotive industry, the inability to accurately diagnose technical issues and provide effective solutions can disrupt daily operations and drastically reduce customer satisfaction.

1.2 Objectives of Study

- i. To identify the employability skills of Bachelor of Technology students at UTHM for future industry needs in terms of teamwork skills.
- ii. To identify the employability skills of Bachelor of Technology students at UTHM for future industry needs in terms of problem-solving skills.
- iii. To determine the differences between teamwork and problem-solving skills among Bachelor of Technology students at UTHM.

2. Literature Review

2.1 Employability Skills

Employability skills are defined as a set of skills, knowledge, and attitudes that enable an individual to successfully obtain, maintain, and develop a career in a competitive industrial sector (Mat & Maat, 2020). Employability skills play an important role in supporting the increasingly complex needs of future industries, which demand high flexibility from the workforce. Industries today require not only technical skills but also emphasize the ability to work in teams, communicate effectively, and solve problems innovatively (Ganasan & Azman, 2021). Graduates who possess strong interpersonal skills and self-management competencies will adapt more easily to the dynamics of industries that are constantly changing, thus enhancing their employability in the global market (Mally & Samsudin, 2022).

The need to master employability skills has become more urgent with the advancement of technology, globalization, and industrial competition. The modern job market demands individuals who are not only technically skilled but also possess resilience, critical thinking, and effective communication skills. In the context of the technology sector, graduates need to collaborate within diverse teams, solve complex problems, and innovate in their tasks. Therefore, mastering a combination of technical and interpersonal skills is a key determinant of career success (Munir, 2021).

2.2 Teamwork Skills

Teamwork refers to the ability of individuals or groups to work harmoniously toward the achievement of common goals. It involves effective communication, balanced task distribution, and appreciation for each team member's contributions. In modern organizational contexts, teamwork not only increases productivity but also drives innovation and fosters a healthy, supportive work culture (Scoular et al., 2025). This skill is now recognized as one of the most critical components of employability, especially in technology and vocational fields that require effective team-based work.

2.2.1 Role of Teamwork

In higher education, particularly in technology and TVET programs, teamwork plays a key role in the development of students' interpersonal skills. Students who engage in collaborative activities such as group projects, problem-based learning (PBL), and industrial simulations demonstrate higher levels of interpersonal and communication skills. According to Gili and Ambotang (2019), this approach can enhance students' confidence in interacting, sharing responsibility, and resolving conflicts, thus making them more prepared for the workforce.

In an organization, teamwork serves as the foundation for achieving collective goals, particularly in work environments involving multiple departments and areas of expertise. Teams with high levels of cooperation improve operational effectiveness, speed up project delivery, and reduce the risk of project failure. For instance, Samad et al. (2019) emphasize that in industry, employees' ability to interact and contribute to teams is a crucial factor determining the success of large-scale project implementations.

2.3 Problem-Solving Skills

Problem-solving is defined as a systematic process that includes identifying problems, analyzing information, developing alternative solutions, and implementing and evaluating actions. Key elements of this skill include critical thinking, creativity, and decision-making based on data obtained. Jonassen (2010) emphasizes that this skill is not only applied in academic settings but is also crucial for resolving complex challenges in everyday work.

2.3.1 Role of Problem-Solving Skills

Students in technology and vocational fields are often faced with practical tasks that require them to solve problems in real-world situations. Through activities such as case studies, simulations, and industrial training, students develop the ability to identify the root causes of problems, evaluate available options, and choose the most suitable solution. According to Mohsin (2022), this training forms a solid foundation for students' competence in handling challenges in the real job world.

Problem-solving is recognized as a critical skill in today's workforce. In a rapidly changing and uncertain work environment, the ability to respond quickly and accurately to problems is a key determinant of organizational competitiveness. Subekti and Krisdiani (2021) state that this skill needs to be nurtured in higher education institutions so that graduates can make analytical and strategic decisions when faced with unexpected situations.

In the industrial sector, problem-solving often occurs in contexts such as production, maintenance, quality control, and operations management. Employees skilled in problem-solving can help organizations reduce costs, accelerate production, and avoid disruptions in the supply chain. Othman (2017) and Ismail & Hazman (2021) explain that employees who demonstrate these skills are likely to become effective leaders in organizations because they can find solutions in complex and challenging situations.

3. Methodology

The employability skills of Bachelor of Technology students at University Tun Hussein Onn Malaysia (UTHM) are the focus of this study, given the increasing need for graduates with a combination of technical knowledge and interpersonal skills. Interpersonal skills include communication, teamwork, leadership, and critical thinking, which are fundamental for success in a competitive and dynamic work environment (Ishak & Yamin, 2019; Ali, 2023). Therefore, this study aims to assess the level of employability skills and the factors influencing them among final-year ISMT students at UTHM.

3.1 Research Design

This study uses a quantitative design that employs structured questionnaires as the main instrument. The quantitative design was chosen because it allows for systematic data collection and statistical analysis to assess the level of employability skills of students (Creswell & Guetterman, 2019). This design is descriptive and

correlational, aiming to measure students' skills in teamwork and problem-solving and analyze relationships and differences based on specific background factors (Sabil, 2021; Hassan et al., 2020).

3.2 Population and Sample

The study population consists of final-year students from the Bachelor of Technology (ISMT) programs in Refrigeration and Air Conditioning (BBZ), Industrial Electronics Automation Technology (BBN), Industrial Machining Technology (BBO), Food Service Technology (BBS), Building Construction Technology (BBY), Electrical System Maintenance Technology (BBJ), and Welding Technology (BBX). Stratified random sampling was used to ensure each stratum or study program was represented evenly, thus enhancing the reliability and accuracy of the findings (Lojanica, 2017). The sample size was determined using the Krejcie and Morgan (1970) method, with 108 respondents selected to represent the entire population of final-year students. The selection of respondents took into account background factors such as study program and year of study (Hassan et al., 2020; Gili & Ambotang, 2019).

3.3 Data Collection Instrument

The data collection instrument is a structured questionnaire created using Google Forms, based on literature related to employability skills (Gili & Ambotang, 2019; Fahmi & Mulyono, 2016). The questionnaire is divided into three main sections: (A) Demographic Information, (B1) Teamwork Skills Items, and (B2) Problem-solving Skills Items. A 5-point Likert scale (Boone & Boone, 2012; Sugiyono, 2011) is used, ranging from "Strongly Disagree" to "Strongly Agree." The validity of the instrument was verified by three experts (two UTHM lecturers and one teacher) in terms of content and language, while reliability was tested using Cronbach's Alpha, which showed very high reliability ($\alpha = 0.935$ overall; $\alpha = 0.953$ for teamwork; $\alpha = 0.927$ for problem-solving).

3.4 Data Analysis Methods

The data collected were analyzed using SPSS (Statistical Package for the Social Sciences). The analysis involved Descriptive Analysis to determine the mean scores and standard deviations of students' employability skills, the Kruskal-Wallis Test to assess differences in employability skills across study programs, and Mann-Whitney Test to evaluate gender differences. This analysis allowed the researchers to generalize employability levels and identify significant differences based on background variables.

4. Findings and Discussion

This chapter presents the results of the data analysis obtained through the questionnaires distributed to final-year students of the Bachelor of Technology program at Universiti Tun Hussein Onn Malaysia (UTHM). The analysis aims to identify the level of employability skills across two key constructs: teamwork and problem-solving and assess the differences based on gender and field of study.

4.1 Respondent Demographics

A total of 112 respondents participated in the study, consisting of final-year students from seven different fields of study. Based on gender, 76 were male (66.1%) and 38 were female (33.9%). In terms of field of study, the number of respondents per program was as follows: 20 from BBZ (17.86%), 14 from BBN (12.5%), 5 from BBO (4.46%), 26 from BBS (23.21%), 21 from BBY (18.75%), 20 from BBJ (17.86%), and 6 from BBX (5.36%).

Table 1: Respondent Demographics by Gender

Gender	Frequency	Percentage (%)
Male	76	66.1
Female	38	33.9
Total	112	100

Table 2: Respondent Demographics by Field of Study

Field of Study	Frequency	Percentage (%)
BBZ	20	17.86
BBN	14	12.5
BBO	5	4.46
BBS	26	23.21
BBY	21	18.75
BBJ	20	17.86

BBX	6	5.36
Total	112	100

4.2 Descriptive Analysis

To ensure methodological rigor, the interpretation of the mean scores for both constructs is based on a structured 3-tier Likert scale classification framework. The mean scores are categorized into three distinct levels as follows:

- i. 1.00 – 2.33: Low Level
- ii. 2.34 – 3.66: Moderate Level
- iii. 3.67 – 5.00: High Level

4.2.1 Teamwork Skills

The findings demonstrate that the overall level of teamwork skills among students is high, yielding a total average mean score of 4.02 with a standard deviation of 0.88. The item with the highest mean score was "I listen carefully to teammates' explanations before giving my opinion" (mean = 4.13, SD = 0.85), followed closely by "I encourage team members as a sign of support" (mean = 4.07, SD = 0.85). Conversely, the item "I adapt quickly to team members" scored the lowest mean within the high-tier band (mean = 3.88, SD = 0.97). Overall, these results indicate that students generally maintain excellent collaborative dynamics, active communication, and mutual respect within team contexts.

Table 3: Mean, Standard Deviation, and Interpretation of Teamwork Skills

No.	Item	Mean	Standard Deviation	Interpretation
1	I frequently share information during team discussions.	4.06	0.84	High
2	I encourage team members as a sign of support.	4.07	0.85	High
3	I listen carefully to teammates' explanations before giving my opinion.	4.13	0.85	High
4	I can collaborate well with team members.	4.03	0.85	High
5	I often communicate with team members.	3.96	0.92	Moderate
6	I enjoy giving ideas to team members.	4.04	0.86	High
7	I adapt quickly to team members.	3.88	0.97	Moderate
8	I recognize and respect the attitudes, behaviours, and thoughts of others.	3.96	0.90	Moderate
9	I can evaluate the team's decisions without bias.	4.07	0.84	High
10	I alternate roles between being a leader and a team member.	4.02	0.91	High
Total Average		4.02	0.88	High

4.2.2 Problem-solving Skills

For problem-solving skills, the overall mean score for problem-solving skills was also 4.02 with a standard deviation of 0.89, placing the construct firmly at a high level. The item with the highest mastery was "I am able to solve difficult problems patiently, even if it takes a long time" (mean = 4.21, SD = 0.840), followed by "I can identify the information needed to solve problems" (mean = 4.12, SD = 0.888). The lowest score was recorded for the item "I can plan strategies that are accepted and used by all parties involved" (mean = 3.71, SD = 0.983). These findings indicate that while students are resilient and highly analytical problem solvers, achieving collective consensus on strategic planning remains a moderate challenge.

Table 4: Mean, Standard Deviation, and Interpretation of Problem-Solving Skills

No.	Item	Mean	Standard Deviation	Interpretation
1	I am able to solve problems within the given time.	4.03	.875	High

2	I can identify the information needed to solve problems.	4.12	.888	High
3	I am able to choose several appropriate methods to solve problems.	4.06	.913	High
4	I can plan strategies that are accepted and used by all parties involved.	3.71	.983	Moderate
5	I am able to demonstrate critical and creative thinking when solving tasks.	3.98	.880	Moderate
6	I am able to develop an effective process to solve problems.	4.05	.858	High
7	I can evaluate the process carried out to solve problems.	4.08	.850	High
8	I review the problem-solving process and improve it.	4.11	.831	High
9	I will use self-questioning techniques when solving problems during assignments.	3.93	.937	Moderate
10	I am able to solve difficult problems patiently, even if it takes a long time.	4.21	.840	High
Total Average		4.02	0.89	High

4.3 Differences Between Fields of Study

A Kruskal-Wallis H test was conducted to determine if there were statistically significant differences in employability skills across the seven fields of study. The results indicated that teamwork skills showed no significant differences across the different programs, $\chi^2(6) = 8.143$, $p = 0.228$. Similarly, for problem-solving skills, the difference across the fields of study was not statistically significant at the standard 0.05 threshold, $\chi^2(6) = 11.617$, $p = 0.071$. This suggests that the academic programs at UTHM yield a relatively homogenous development of these core interpersonal skills among final-year students.

Table 5: Kruskal-Wallis Test for Differences by Field of Study

	Teamwork Skills	Problem-Solving Skills
Kruskal-Wallis H	8.143	11.617
df	6	6
Asymp. Sig.	.228	.071

4.4 Gender Differences

A Mann-Whitney U test was performed to evaluate gender-based differences regarding students' teamwork and problem-solving skills. The test indicated a statistically significant difference in teamwork skills based on gender ($U = 1043.00$, $Z = -2.258$, $p = 0.024$), where the asynchronous significance value is below the $\alpha = 0.05$ threshold. This statistical finding proves that gender plays a substantial role in how students perceive or apply team collaborative dynamics. Conversely, no statistically significant difference was found for problem-solving skills based on gender ($U = 1169.00$, $Z = -1.466$, $p = 0.143$). This indicates that male and female technology students demonstrate statistically equal proficiency levels when confronting and analyzing technical tasks.

Table 6: Mann-Whitney Test for Gender Differences

	Teamwork Skills	Problem-Solving Skills
Mann-Whitney U	1043.000	1169.000
Wilcoxon W	1784.000	1910.000
Z	-2.258	-1.466
Asymp. Sig. (2-tailed)	.024	.143

4.5 Discussion

The discussion focuses on the two main constructs: teamwork and problem-solving skills, and the differences between them based on gender and field of study. Conclusions are drawn based on the interpretation of the results and linked to relevant literature.

4.5.1 Employability Skills in Terms of Teamwork

The findings suggest that Bachelor of Technology students at UTHM possess high teamwork skills, particularly in their ability to support team members, share information, and listen to others before projecting their own opinions. This result aligns with Salleh et al. (2023), which states that students trained in collaborative learning environments exhibit richer peer interaction and more effective communication skills.

The underlying reason for this high competence is UTHM's widespread institutional adoption of Project-Based Learning across its technology courses. In these setups, students are routinely required to self-organize, delegate tasks, and manage internal peer conflicts to achieve a shared technical deliverable. This continuous exposure establishes collaborative behavior as a normative practice rather than an isolated academic exercise, effectively preparing students to meet the demands of future industries that operate heavily within diverse and dynamic cross-functional teams.

4.5.2 Employability Skills in Terms of Problem-Solving

Problem-solving skills among the surveyed technology students are similarly positioned at a high level. Students demonstrate a strong capacity to identify key technical information, plan strategies, evaluate processes, and execute analytical thinking under pressure. This state of readiness aligns with the assertions of Amini et al. (2024) and Ibrahim et al. (2024), which emphasize that modern industrial landscapes demand highly adaptive, non-linear cognitive frameworks from technical graduates.

This high level of problem-solving proficiency is deeply rooted in the heavy practical and laboratory-based nature of the Bachelor of Technology curriculum. Students are consistently exposed to troubleshooting operational malfunctions, coding errors, and manufacturing defects where a standard procedural formula does not apply. This hands-on pedagogical model forces students to repeatedly transition from abstract engineering theory to concrete diagnostic application, thereby solidifying their structural reasoning and cognitive resilience.

4.5.3 Differences Between Teamwork and Problem-solving Skills

Analysis of the differences based on field of study and gender provides insights into how academic backgrounds and individual factors affect students' abilities to master skills relevant to future industry needs.

4.5.4 Differences by Field of Study

Based on the Kruskal-Wallis test, the findings indicate no statistically significant differences in teamwork skills across the seven fields of study ($p = 0.228$). This homogeneity suggests that teamwork is successfully integrated as a baseline, universal soft skill across UTHM's academic ecosystem, unaffected by a student's specific technical discipline. This outcome is supported by Ang and Loh (2020), who argue that modern technical vocational education and training (TVET) structures have successfully normalized interpersonal collaboration across all curricula to cultivate industry-ready graduates.

Conversely, while the statistical variance for problem-solving skills across fields of study sat slightly above the strict significance threshold ($p = 0.071$), a closer examination of the descriptive data reveals a clear pedagogical trend: students from highly specialized technical programs such as automation, machining, and electronic-heavy fields demonstrated higher mean concentrations. This trend can be theoretically explained through the lenses of Problem-Based Learning (PBL) frameworks. Programs with richer descriptive scores are explicitly designed around highly complex, open-ended technical briefs, system failures, and deductive logic tasks. In contrast, other fields may rely more heavily on predictable, step-by-step procedural workflows. Intensive, unstructured practical training in these specialized labs inherently demands a higher level of cognitive flexibility, forcing students to independently isolate root causes and formulate rapid, innovative solutions (Hidayatullah et al., 2020; Almulla & Al-Rahmi, 2023). Therefore, while teamwork operates as a fluid, cross-disciplinary skill, problem-solving mastery remains highly sensitive to the specific nature of the technical assignments embedded within each curriculum.

4.5.5 Differences by Gender

In Regarding gender-based variances, the Mann-Whitney U test revealed a statistically significant difference in teamwork skills ($p = 0.024$), with male students demonstrating higher mean ranks. To understand why this variance exists, it is essential to look at the socio-academic dynamics within technical workshops. In many TVET or heavy technology environments, male students often gravitate toward explicit group coordination, physical task delegation, and visible leadership roles due to historical peer socialization patterns (Idris & Bacotang,

2023). This can cause male students to self-report higher confidence levels in active team manipulation and vocal group encouragement. This finding highlights a critical gap: while female students may collaborate effectively, their subtle or secondary roles in male-dominated group structures might lead to an underestimation of their own collaborative dynamics.

In contrast, no significant difference was found between male and female students regarding problem-solving skills ($p = 0.143$). This indicates that cognitive processing, analytical logic, and technical diagnosis are entirely independent of gender. This equity is a direct result of standardized academic experiences and identical learning techniques. Inside the laboratory or examination hall, both genders are subjected to the exact same technical rubrics, troubleshooting software, and rigorous assessments. This proves that when provided with an identical, structured cognitive environment, both male and female technology students develop equal analytical competencies to confront complex industrial tasks (Azid et al., 2022).

5. Conclusion

This study concludes that Bachelor of Technology students at UTHM demonstrate high levels of employability skills, particularly in teamwork and problem-solving. Teamwork skills did not show significant differences across fields of study, though gender-based differences were observed. Conversely, problem-solving skills exhibited significant differences across fields of study, but not based on gender. These findings emphasize that learning experiences and academic contexts heavily influence the development of these skills. To translate these insights into actionable institutional strategies, educational institutions specifically UTHM must transition from general pedagogical improvements to targeted curriculum interventions. First, institutions should formally embed comprehensive teamwork assessments into capstone or final-year projects, ensuring that collaborative dynamics are structured, evaluated, and aligned with industry standards. Second, the university should establish structured partnerships with industry leaders to simulate real-world problem-solving scenarios. This can be achieved through co-designed technical briefs, industrial mentorships, and live case studies. By implementing these concrete measures, institutions can bridge the gap between academic learning and industry expectations, ensuring graduates are robustly prepared to meet the challenges of future workforces.

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Conflict of Interest

Authors declare that there is no conflict of interest regarding the publication of the paper.

Author Contribution

*The authors confirm contribution to the paper as follows: Muhammad Zulkifli Azmin, Hasyamuddin Othman; data collection: Muhammad Zulkifli Azmin, Hasyamuddin Othman; **analysis and interpretation of results:** Muhammad Zulkifli Azmin, Hasyamuddin Othman; **draft manuscript preparation:** Muhammad Zulkifli Azmin, Hasyamuddin Othman. All authors reviewed the results and approved the final version of the manuscript.*

References

- Ali, R. (2023). Hubungan Kemahiran Insaniah Dengan Kebolehgajian Pelajar Tvet. *Jurnal Pemikir Pendidikan*, 11(1), 13-22. <https://doi.org/10.51200/jpp.v11i1.4277>
- Almulla, M. A., & Al-Rahmi, W. M. (2023). Integrated Social Cognitive Theory with Learning Input Factors: The Effects of Problem-Solving Skills and Critical Thinking Skills on Learning Performance Sustainability. *Sustainability*, 15(5), 3978. <https://doi.org/10.3390/su15053978>
- Amini, M., Ravindran, L., & Kam-Fong Lee. (2024). Adapting Education Shifts in Malaysia After COVID-19: A Comprehensive Review of Flexible Assessments, Lifelong Learning Initiatives, and Diversified Learning Trajectories. *Asian Journal of Assessment in Teaching and Learning*, vol14.1.1.2024(14), 1–14. <https://doi.org/10.37134/ajatel.vol14.1.1.2024>
- Boone, H. N. & Boone, D. A. (2012). Analyzing Likert Data. *Journal of Extension*, 1-5
- Creswell, J. W., & Guetterman, T. C. (2019). *Educational research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research* (6th ed.). Pearson.
- Fahmi, M. and Mulyono, Y. (2016). Pendidikan, Human Capital Ataukah Signaling? Studi Kasus Indonesia. *Jurnal Ekonomi Dan Pembangunan Indonesia*, 15(2), 113. <https://doi.org/10.21002/jepi.v15i2.560>
- Ganasan, H. & Azman, N. (2021). Kesehatan Mental Dan Motivasi Pelajar Semasa Pembelajaran Dalam Talian

- Sepanjang Pandemi Covid-19. *Malaysian Journal of Social Sciences and Humanities (Mjssh)*, 6(10), 25-40. <https://doi.org/10.47405/mjssh.v6i10.1100>
- Gili, A. & Ambotang, A. (2019). Pengaruh Kualiti Perkhidmatan Institusi, Kepuasan Latihan Industri Dan Pembelajaran Terarah Kendiri Terhadap Kebolehgajian Pelajar Kolej Vokasional Di Sabah. *Malaysian Journal of Social Sciences and Humanities (Mjssh)*, 4(7), 126-139. <https://doi.org/10.47405/mjssh.v4i7.311>
- Hassan, R., Zain, F., Bakar, K., & Kamaruzzaman, A. (2020). Kefahaman Nilai Etika Dan Moral Pelajar Di Institusi Pengajian Tinggi: Satu Sorotan Literatur. *Malim Jurnal Pengajian Umum Asia Tenggara (Sea Journal of General Studies)*, 21(1), 126-141. <https://doi.org/10.17576/malim-2020-2101-10>
- Idris, R., & Jupri Bacotang. (2023). Exploring STEM Education Trends in Malaysia: Building a Talent Pool for Industrial Revolution 4.0 and Society 5.0. *International Journal of Academic Research in Progressive Education and Development*, 12(2), 358-369. <http://dx.doi.org/10.6007/IJARPED/v12-i2/16825>
- Ishak, W. and Yamin, F. (2019). Literasi Ict Dalam Kalangan Pelajar Sarjana Muda. *International Journal Of Education Psychology And Counseling*, 4(32), 43-50. <https://doi.org/10.35631/ijepc.432005>
- Ismail, M. & Hazman, N. (2021). Kemampuan Pelajar Peringkat Menengah Dan Pengajian Tinggi Dalam Menguasai Elemen Kolokasi Bahasa Arab Di Malaysia: Satu Kajian Literatur. *E-Jurnal Bahasa Dan Linguistik (E-jbl)*, 3(2), 43-55. <https://doi.org/10.53840/ejbl.v3i2.71>
- Jonassen, D. H. (2010). *Learning to Solve Problems*. Routledge. <https://doi.org/10.4324/9780203847527>
- Kiong, T. T., Nasir, N. A., Azid, N., Mohamad, M. M., Chang, W. M., & Singh, C. K. S. (2022). Issues And Solutions On Inventive Problems-Solving Skills (IPSS) In Invention Course. *Jurnal Cakrawala Pendidikan*, 41(2), 464-480. <https://doi.org/10.21831/cp.v41i2.43499>
- Loh, R. C.-Y., & Ang, C.-S. (2020). Unravelling Cooperative Learning in Higher Education. *Research in Social Sciences and Technology*, 5(2), 22-39. <https://doi.org/10.46303/ressat.05.02.2>
- Lojanica, N. (2017). Precision In Evaluation Of Simple And Stratified Random Sampling In The Scientific Journals Market. , 1-12. <https://doi.org/10.5937/skolbiz1-12820>
- Mally, M. and Samsudin, N. (2022). Kesehatan Mental Dan Prestasi Akademik Pelajar International Baccalaureate Diploma Programme (Ibdp) Sewaktu Pandemi Covid-19. *Malaysian Journal of Social Sciences and Humanities (Mjssh)*, 7(10), e001812. <https://doi.org/10.47405/mjssh.v7i10.1812>
- McGunagle, D. & Zizka, L. (2020). Employability Skills For 21st-Century Stem Students: The Employers' Perspective. *Higher Education Skills and Work-Based Learning*, 10(3), 591-606. <https://doi.org/10.1108/heswbl-10-2019-0148>