

HALALSPHERE

International Islamic University Malaysia - INHART



Strengthening halal culinary talent in Malaysian TVET: Development of a competency-based assessment kit (CBAK)

Nur Iman Hashim^{a*} & Nadzirah Mohd Fauzi^b

^aFaculty of Hospitality and Tourism Management, UCSI University, Malaysia.

^bFaculty of Economics, Accounting and Management, Universiti Islam Selangor (UIS), Malaysia.

*Corresponding author: E-mail address: Nur-Iman@ucsiuniversity.edu.my

Received: 19/12/2025

Accepted: 28/1/2026

Published: 31/1/2026

Keywords:

Competency-based assessment; Culinary training; Halal education; TVET; Malaysia

Abstract

Malaysia's Technical and Vocational Education and Training (TVET) sector is instrumental in cultivating a skilled workforce for the food service industry, which constitutes a significant pillar of the national economy. Notwithstanding notable advancements in policy formulation and curriculum design, assessment practices in Malaysian TVET culinary programmes remain largely theory-driven, thereby constraining their capacity to effectively evaluate and develop workplace-ready halal assurance competencies. This paper outlines a proposed Competency-Based Assessment Kit (CBAK) for halal culinary TVET programmes, informed by constructivist learning principles and the Competency-Based Education and Training (CBET) approach. The framework incorporates performance-oriented assessment activities, selected halal certification components, digital assessment tools, and input from relevant industry stakeholders to improve alignment with Shariah-compliant practices. Attention is also given to the role of collaboration with halal industry actors and regulatory bodies in supporting graduate readiness across both professional practice and religious considerations. Overall, the proposed conceptual framework is presented as a reference point for enhancing halal talent development within Malaysian TVET institutions and may offer potential for adaptation in other ASEAN and Organisation of Islamic Cooperation (OIC) contexts.

1. Introduction

The national drive to position Malaysia as a global halal hub has intensified the demand for a workforce that integrates advanced culinary competencies with a comprehensive understanding of halal principles and regulatory requirements. Within this landscape, halal culinary TVET programmes play a critical role, functioning as key institutional pathways for cultivating industry-ready professionals who are technically proficient and compliant with halal standards (Halal Development Corporation, 2022). Despite significant policy and curriculum developments, industry evidence indicates persistent gaps in practical competencies among graduates, particularly in critical areas such as contamination control and *Shari'ah*-compliant hygiene protocols (Low & Mah, 2024; Omar *et al.*, 2023). The prevailing dependence on theoretical assessments is insufficient for evaluating operational skills essential to halal culinary practice, including ingredient traceability, utensil segregation, and ritual cleaning procedures (Yaakob *et al.*, 2022), resulting in graduates whose employability is constrained when benchmarked against international halal assurance standards (Shafie & Othman, 2022).

Recent scholarship highlights the importance of competency-based and performance-oriented assessment approaches in TVET, emphasising their capacity to bridge the gap between theoretical understanding and applied skill mastery, particularly within technical and practice-driven disciplines

(Al Shuaili, 2025; Suhairom *et al.*, 2019). Systematic reviews further demonstrate that competency-based assessments provide robust mechanisms for capturing learner performance in authentic, industry-aligned contexts, while simultaneously generating actionable feedback that informs and enhances instructional practice (Yusop *et al.*, 2022). Collectively, this body of evidence substantiates the adoption of competency-based assessment approaches in halal culinary TVET programmes.

Responding to these pedagogical and industry-driven imperatives, this study introduces the Competency-Based Assessment Kit (CBAK) as an innovative assessment framework grounded in constructivist learning theory and the principles of competency-based education (Lewis, 2022). The CBAK is designed to mirror the operational realities of halal-certified kitchens through authentic, performance-based assessment tasks, supported by digital assessment instruments, including detailed rubrics, scenario-based activities, and standardised checklists. This design enables systematic evaluation of both technical culinary competencies and halal-compliant ethical practices.

Notably, the CBAK aligns with Malaysia's National TVET Policy 2030 (Malaysia TVET Council, 2024) and the strategic priorities of the 13th Malaysia Plan (Economic Planning Unit, 2021), which emphasise industry relevance, outcome-based learning, and enhanced graduate employability. By translating constructivist and competency-based principles into a coherent and structured assessment system, the CBAK

facilitates consistent, observable, and industry-validated evaluation of halal culinary performance. In doing so, it addresses documented deficiencies in existing halal culinary assessment practices (Mohamed *et al.*, 2024). It offers a scalable model for developing halal culinary professionals who can meet both national regulatory requirements and international industry expectations.

2. Literature review

The convergence of Technical and Vocational Education and Training (TVET) with the halal industry represents a critical nexus for Malaysia's ambition to become a globally recognised halal hub. As the demand for halal-certified products and services expands beyond Muslim-majority nations into global markets, ensuring that vocational graduates possess the necessary halal competencies has become an urgent national priority. The literature reveals an evolving discourse on integrating halal principles into the vocational education landscape, emphasising the need for curriculum reform, assessment innovation, and closer alignment with industry standards (Tukiran *et al.*, 2025; Rofiah *et al.*, 2024; Abdul Rahim *et al.*, 2022).

Research on competency expectations within the halal industry, particularly for culinary and food services, establishes important conceptual frameworks while revealing persistent implementation gaps. Suhairom *et al.*, (2019), for instance, developed a vocational culinary competency model integrating essential hard and soft skills, from food safety to problem-solving. A critical limitation of this model, however, is the lack of formalised assessment tools for halal-specific practices such as cross-contamination control, ritual cleansing (*istinja'*), and halal-critical control point (HCCP) monitoring. This shortcoming is corroborated by Zulkifli *et al.* (2019), who, in their conceptual framework for culinary programmes in TVET, conclude that most educational institutions do not systematically embed halal compliance into competency assessment. Consequently, a significant gap remains between acquired knowledge and its verifiable application in practice.

In essence, the root of this implementation gap lies in human factors. Research in food service management directly attributes breaches in halal integrity to personnel's inadequate knowledge and irregular training (Che Hassan & Osman, 2024; Ariffin *et al.*, 2023). This results in an operational paradox: while human capital is indispensable, it simultaneously represents the system's primary vulnerability (Shahidan & Amid, 2023). In practice, these competency deficits materialise as critical lapses, including flawed ingredient verification, failures in segregation protocols, and insufficient documentation.

According to Mohd Yunos *et al.* (2025), deficiencies evident in industry practice are mirrored in the educational context when halal principles are delivered predominantly at a theoretical level, without reinforcement through structured, performance-based assessment. This underscores the need for tools like the proposed CBAK, which translate halal standards into observable, assessable practices. Hence, for Malaysia to maintain its competitive edge in the global halal economy, vocational education providers, through their programmes, must produce graduates who can demonstrably apply halal assurance protocols, not just understand them.

Moreover, consumer trust and international market competitiveness further underscore the importance of reliable halal certification processes. Rofiah *et al.* (2024) and Shafie and Othman (2022) asserted that halal certification is

increasingly seen as a quality standard by both Muslim and non-Muslim consumers. The effectiveness of such certification systems, however, is heavily reliant on the competencies of food handlers, chefs, and production staff. When vocational graduates are insufficiently trained to meet these standards, it compromises not only their employability but also the brand integrity of halal-certified businesses (Md Nawi *et al.*, 2023; Hashim *et al.*, 2020).

A notable gap in the literature concerns assessment methodology in halal-related TVET programmes. While curriculum integration has received some attention, assessment tools that authentically capture *Shari'ah*-compliant culinary practices remain underdeveloped (Harun *et al.*, 2021). This limitation is especially concerning given the growing emphasis on competency-based education (CBE). As Suhairom *et al.*, (2019) argue, traditional theory-heavy assessments do not align with workplace realities, particularly in the hospitality sector, where skills are best demonstrated through authentic, performance-based tasks. Therefore, there is a clear need for innovative assessment approaches, such as the CBAK, that enable structured, observable, and measurable evaluations aligned with halal principles.

In parallel, the digital transformation of vocational education has introduced new possibilities for assessment and quality assurance. Zulkifli *et al.*, (2019) and Azman *et al.*, (2024) discuss how digital tools, such as learning management systems, e-portfolios and automated rubric systems can support the delivery and evaluation of halal educational programmes. These technologies provide traceability and scalability, which are especially critical for halal practices that require robust documentation and audit trails (Ellahi *et al.*, 2026). Incorporating such tools into the CBAK framework can further enhance the credibility and operational utility of halal training in vocational settings.

Furthermore, international studies reinforce the need for standardisation and global benchmarking in halal education and assessment. Hewege and Perera (2020), for instance, identify persistent inconsistencies in halal certification practices and educational programmes across different national contexts and consequently call for harmonised frameworks that ensure greater uniformity in both knowledge acquisition and practical application. In a related vein, Rofiah *et al.* (2024) emphasise that variations in halal education content and assessment practices across countries contribute to inconsistent competency outcomes, underscoring the need for standardised, competency-based frameworks to ensure reliable halal compliance in vocational settings. Supporting this perspective, Hennida *et al.* (2024) contend that effective halal assurance systems are highly dependent on workforce competence, which must be developed through structured training and assessment approaches aligned with recognised international standards. Collectively, these findings suggest that halal culinary TVET programmes in Malaysia, if systematically structured and rigorously assessed, have the potential to function as a reference model for the international standardisation of halal vocational education.

In sum, the reviewed literature reveals a substantial gap in assessment-related innovations capable of bridging the disconnect between academic preparation and the operational realities of halal-compliant workplaces. This gap underscores the relevance of a contextually grounded, performance-based assessment solution such as the proposed CBAK. By integrating digital assessment tools, industry-validated rubrics, and explicitly *Shari'ah*-compliant competencies, the

CBAK is well positioned to enhance the quality, consistency, and international relevance of halal vocational education in Malaysia and, potentially, beyond.

3. Operational definition of applied halal culinary competencies

In this study, applied halal culinary competencies are operationally defined as a set of observables, measurable, and performance-based practices required to ensure *Shari'ah*-compliant food preparation within professional kitchen environments. These competencies extend beyond declarative halal knowledge and encompass five core domains:

- a) **Ingredient verification**, referring to the ability to identify, verify, and document halal-certified raw materials and processed ingredients (Mohd Noor *et al.*, 2023);
- b) **Segregation and sanitation**, including physical separation of halal and non-halal items, utensils, storage areas, and the application of ritual cleansing (*sertu/samak*) procedures where required (Shaharuddin, 2025);
- c) **Halal Critical Control Points (HCCPs)**, involving the identification and management of contamination risks across food handling, preparation, cooking, storage, and service stages (Ibrahim *et al.*, 2024).;
- d) **Documentation and traceability**, which includes maintaining halal compliance records, checklists, and audit evidence aligned with Halal Food Standards (MS1500:2019) (Ellahi *et al.*, 2026); and
- e) **Corrective actions**, referring to the ability to respond appropriately to halal breaches through disposal, re-cleansing, reporting, and procedural correction (Ahmad & Mohd. Shariff, 2017).

Within the proposed CBAK, these competencies are assessed through performance-based culinary tasks supported by structured rubrics, observation checklists, and digital documentation tools, ensuring alignment between assessment design, industry expectations, and regulatory requirements.

4. Conceptual basis for the research methodology

This study plans to adopt a Design and Development Research (DDR) methodology, a well-established approach in educational research that is particularly effective for developing practical tools such as assessment instruments (Abdullah *et al.*, 2021). DDR is characterised by a systematic and iterative process encompassing three primary phases: Needs Analysis, Design and Development, and Evaluation (Jaya *et al.*, 2021). This methodology is particularly suitable for developing the CBAK for halal culinary TVET programmes because it allows continuous refinement of the tool based on stakeholder input and contextual evidence, ensuring both theoretical alignment and practical relevance (Richey & Klein, 2014). By integrating iterative cycles of design, testing, and evaluation, DDR enables the planned assessment kit to be validated in real educational settings, supporting its effectiveness in measuring applied halal culinary competencies.

Phase 1: Needs analysis

The first phase involves identifying critical competency gaps in current halal culinary TVET programmes and assessment frameworks. Data will be collected through semi-structured interviews, focus group discussions, and document reviews

involving culinary educators, halal certification agencies such as JAKIM, and hospitality industry stakeholders. These qualitative methods will identify deficiencies in halal compliance assessment and highlight underrepresented competencies in existing TVET systems (Ibrahim *et al.*, 2024; Green & du Plessis, 2023). A structured survey will complement these methods and will be administered to culinary educators and assessors, with a sample size determined using Krejcie and Morgan's (1970) formula to ensure statistical representativeness.

Phase 2: Design and development

The second phase will involve the iterative development of CBAK components, including scenario-based assessment tasks, rubrics for halal compliance, digital checklists, and video documentation templates. The design will be informed by the Malaysian Qualification Framework (MQF) and the National Occupational Skills Standards (NOSS) to ensure contextual appropriateness and professional alignment (Mohamed *et al.*, 2024). Expert input will be obtained using the Delphi technique, a recognised method for achieving consensus and enhancing content validity (Hasson *et al.*, 2025).

Educational design will be guided by constructivist learning theory, which emphasises experiential, hands-on learning (Do *et al.*, 2023). This theoretical basis supports the use of authentic assessments and performance-based tasks that mirror real-world kitchen environments (Lim *et al.*, 2023). This approach ensures that the assessment kit not only measures technical skills but also evaluates critical thinking, creativity, and halal awareness.

Basically, higher-order learning outcomes within the CBAK are operationalised through task-specific performance indicators (Ibrahim *et al.*, 2020). Critical thinking is assessed through scenario-based problem-solving tasks requiring trainees to identify halal compliance risks and determine appropriate corrective actions (Adri *et al.*, 2022). Creativity is evaluated through menu-planning and food-presentation tasks that require innovation while adhering to halal constraints (Ozturk, 2024). Halal awareness is measured through consistent adherence to halal protocols, accurate justification of actions taken, and reflective explanations documented in assessment artefacts (Shah & Bakri, 2024). Each construct is scored using analytic rubrics with clearly defined performance descriptors to ensure objectivity and reliability.

Phase 3: Evaluation

The final phase consists of a mixed-method evaluation of the developed CBAK. The kit will be piloted across selected Malaysian TVET education institutions offering halal culinary programmes. Evaluation will be conducted through:

- Rubric-based scoring analysis
- Pre and post tests
- Instructor and student feedback surveys
- External validation by halal auditors

Quantitative data from the pre- and post-tests will be analysed using paired-samples t-tests to assess improvements in learner performance, following Aghayani and Hajmohammadi (2019). To examine differences across institutions or demographic groups, additional inferential analyses, such as analysis of variance (ANOVA), will be performed (Blanca *et al.*, 2023). Prior to ANOVA, the data will be screened for normality, homogeneity of variance, and independence of observations, as

recommended by Blanca *et al.* (2023). If these assumptions are not met, suitable non-parametric alternatives will be used.

Inter-rater reliability will be examined using the intraclass correlation coefficient (ICC), specifically a two-way random-effects model with absolute agreement, as recommended by ten Hove *et al.* (2024), given the involvement of multiple trained assessors evaluating the same performance tasks. This approach ensures robust estimation of scoring consistency across evaluators within authentic halal culinary assessment settings.

Statistical software

All quantitative data will be analysed using descriptive and inferential statistical analyses in IBM SPSS Statistics (version 28), following the procedural guidelines outlined by Pallant (2020). For qualitative data, thematic analysis will be conducted using NVivo to support systematic coding, theme development, and data visualisation (Dhakal, 2022). The integration of these analytical approaches enables a comprehensive and rigorous examination of both numerical trends and narrative insights.

5. Underpinning theories

The conceptualisation of the CBAK integrates two foundational theoretical approaches: Vygotsky's (1978) social constructivist learning theory and Mager's (1962) Competency-Based Education and Training (CBET) framework, both specifically adapted for halal culinary TVET programmes.

Vygotsky's constructivist theory emphasises that knowledge is constructed through social interaction and contextualised experience, particularly through guidance from more knowledgeable others (Vygotsky, 1978). In halal culinary education, this translates to immersive, collaborative learning experiences where trainees develop halal competencies through authentic kitchen scenarios, from ingredient procurement to final food preparation, while receiving mentorship from industry experts (Saipudin & Suhairom, 2021). This approach ensures learners internalise both the technical and ethical dimension of halal compliance through practical engagement.

Complementing this, Mager's (1962) CBET model provides the structural framework for defining and assessing observable performance outcomes. Applied to halal culinary TVET programmes, CBET establishes clear competency standards for *Shari'ah*-compliant food handling, kitchen workflow, and hygiene protocols (Nik Mohd Rosli *et al.*, 2022). The model's emphasis on measurable skills ensures graduates meet both occupational requirements and Malaysia's stringent halal certification standards (Halal Development Corporation, 2022).

The synergy of these frameworks enables the CBAK to deliver pedagogically robust yet industry-aligned assessments. Vygotsky's theory informs the design of authentic learning environments, while Mager's CBET provides the criteria for competency validation. Together, they create a comprehensive system that bridges theoretical knowledge with practical halal culinary expertise, addressing both skill development and regulatory compliance needs in Malaysian TVET institutions.

6. Discussion

Current assessment practices across halal culinary TVET programmes in Malaysia rarely incorporate halal

compliance as an explicit criterion, resulting in inconsistent graduate readiness for the halal industry. While many educational institutions offer halal awareness or introductory modules, these are seldom linked to practical skill assessments (Shah *et al.*, 2024). Consequently, graduates often struggle to meet the expectations of halal-certified kitchens, where strict adherence to hygiene, sourcing, and storage protocols is non-negotiable (Ahmadun & Rifin, 2025; Nayan & Nayan, 2024).

The proposed CBAK seeks to address this gap by incorporating assessment tasks that closely replicate real-world halal food preparation scenarios. These tasks assess key competencies, including sourcing halal-certified ingredients, preventing cross-contamination, observing ritual cleanliness requirements, and applying proper storage and waste management practices. Each assessment task will be accompanied by detailed performance rubrics that use MS1500:2019 to define *Shari'ah* compliance criteria and halal control points. At the same time, NOSS provides the occupational competency levels, performance standards, and observable work outcomes. The integration of these standards ensures that assessments are both religiously compliant and aligned with industry-recognised vocational competencies.

The integration of digital tools such as halal compliance checklists, e-portfolios, and video-based assessments will increase the adaptability, consistency, and transparency of the CBAK (Voak *et al.*, 2023). These tools enable institutions to validate student performance across different locations while providing timely feedback to learners. Moreover, halal integrity is more easily maintained when training and assessments are traceable and auditable (Mohamed *et al.*, 2024).

Equally vital is the role of halal industry stakeholders in co-developing and validating the kit. Collaborations with halal certifying bodies, such as JAKIM, and industry partners ensure that assessments remain current and relevant. Prior research suggests that TVET programmes co-created with industry partners lead to higher employment rates and greater job satisfaction among graduates (Hanafi *et al.*, 2023).

7. Conclusion

Considering Malaysia's commitment to halal leadership, the development of CBAK, which is tailored to halal culinary TVET programmes, is both timely and essential. By moving beyond theoretical evaluations and incorporating authentic, *Shari'ah*-compliant performance assessments, the CBAK supports the cultivation of a new generation of halal culinary professionals. It offers a pedagogically robust and industry-aligned framework that enhances teaching effectiveness, student learning outcomes, and employability in halal-certified food services (Nik Mohd Rosli *et al.*, 2022). Furthermore, the CBAK provides a replicable model for halal talent development across diverse vocational sectors and can be adapted by other OIC member countries striving to elevate their halal human capital standards.

8. Acknowledgment

The authors acknowledge Halalsphere for providing a platform for disseminating this research. Appreciation is also extended to Universiti Islam Selangor (UIS) through the Faculty of Economics, Accounting and Management, and the Halal Advisory and Research Institute Selangor (HARIS), as well as to UCSI University through the Faculty of Hospitality and Tourism Management, for their institutional support and collaboration.

9. Conflicts of interest

The authors declare no conflict of interest in the preparation or dissemination of this paper.

References

- Ab Talib, M. S., & Hamid, A. B. A. (2014). Halal logistics in Malaysia: A SWOT analysis. *Journal of Islamic Marketing*, 5(3), 322–343. <https://doi.org/10.1108/JIMA-03-2013-0018>
- Abdul Rahim, N. R., Abdullah, I., Yahya, N. A., Awang, M. N., Muhammad, S. Z., Ahmad Sabri, S., & Ahmad, N. N. (2022). Negotiation of needs towards the sustainability of halal talents. *Journal of Islamic Marketing*, 13(1): 20–44. <https://doi.org/10.1108/JIMA-11-2019-0245>
- Abdullah, M. R. T. L., Rozkee, R. M., & Siraj, S. (2021). Pendekatan penyelidikan rekabentuk dan pembangunan: Aplikasi kepada penyelidikan pendidikan. Penerbit UPSI. ISBN 978-967-2851-24-0
- Adri, J., Refdinal, A., & Abdullah, A. S. (2022). Critical thinking skills in performance-based assessment: Instrument development and validation. *Journal of Technical Education and Training*, 14(1), Article 008. <https://doi.org/10.30880/jtet.2022.14.01.008>
- Aghayani, B., & Hajmohammadi, E. (2019). Project-based learning: Promoting EFL learners' writing skills. *LLT Journal: A Journal on Language and Language Teaching*, 22(1), 78–85. <https://doi.org/10.24071/llt.2019.220108>
- Ahmad, N., & Mohd. Shariff, S. (2017). Halal cleansing operations towards halal integrity: A literary insight. *Selangor Business Review*, 2(1), 35–48.
- Ahmadun, S., & Rifin, M. K. I. (2025). Halal awareness of halal certification among entrepreneurs in Malaysia. *Journal of Contemporary Islamic Studies*, 10(3). <https://doi.org/10.24191/jcis.v10i3.2969>
- Al Shuaili, A. (2025). Bridging the skills gap: Technical and vocational education and training student competencies and labour market alignment in Oman. *Vocation, Technology & Education*, 2. <https://doi.org/10.54844/vte.2025.0991>
- Ariffin, N., Sundram, V. P. K. & Zulfakar, M. H. (2023). Systematic literature review of halal purchasing in value chain management. A Qualitative research era from 2011 to 2022. *Advances in Social Sciences Research Journal*, 10(6.2):291306. <https://doi.org/10.14738/assrj.106.2.15021>
- Azman, A., Hamzah, M., & Razak, K. (2024). Exploring the impact of digital technology transformation in Islamic education: The Islamic education teachers' perspective. *e-Bangi Journal of Social Science and Humanities*, 21, 18. <https://doi.org/10.17576/ebangi.2024.2102.18>
- Blanca, M. J., Arnau, J., García-Castro, F. J., Alarcón, R., & Bono, R. (2023). Repeated measures ANOVA and adjusted F-tests when sphericity is violated: Which procedure is best? *Frontiers in Psychology*, 14, 1192453. <https://doi.org/10.3389/fpsyg.2023.1192453>
- Che Hassan, M. H. & Osman, L. H. (2024). Improving integrity of halal suppliers in the food supply chain: scoping review. *Journal of Technology and Operations Management*, 19(1), 24–39. <https://doi.org/10.32890/jtom2024.19.1.3>
- Department of Standards Malaysia. (2019). Halal food standards (MS1500:2019) - production, preparation, handling and storage - General guidelines (Third Revision). Kuala Lumpur: Department of Standards Malaysia
- Department of Skills Development. (2022). Food preparation and production (National Occupational Skills Standard: NOSS-I561-005-2:2022). Ministry of Human Resources, Malaysia.
- Department of Skills Development. (2022). Culinary arts operation (National Occupational Skills Standard: NOSS-I561-005-3:2022). Ministry of Human Resources, Malaysia.
- Department of Skills Development. (2025). Culinary arts production (National Occupational Skills Standard: NOSS-I561-005-4:2025). Ministry of Human Resources, Malaysia.
- Department of Skills Development. (2025). Culinary arts craftsmanship (National Occupational Skills Standard: NOSS-I561-005-5:2025). Ministry of Human Resources, Malaysia.
- Dhakal, K. (2022). NVivo. *Journal of the Medical Library Association*, 110(2), 270–272. <https://doi.org/10.5195/jmla.2022.1271>
- Do, H. N., Do, B. N., & Nguyen, M. H. (2023). How do constructivist learning environments generate better motivation and learning strategies? The design science approach. *Heliyon*, 9(12), e22862. <https://doi.org/10.1016/j.heliyon.2023.e22862>
- Economic Planning Unit. (2026). 13th Malaysia Plan (2026–2030). Government of Malaysia.
- Ellahi, R. M., Wood, L. C., & Bekhit, A. E.-D. A. (2026). A multi-layer industry 4.0 framework for ensuring halal integrity in NZ meat supply chains. *Food Control*, 182, Article 111880. <https://doi.org/10.1016/j.foodcont.2025.111880>
- Field, A. (2013). *Discovering statistics using IBM SPSS Statistics* (4th ed.). SAGE Publications.
- Green, S. L., & du Plessis, E. C. (2023). Project-based Learning to promote learner autonomy in training hospitality education at a technical and vocational education and training college. *International Journal of Learning, Teaching and Educational Research*, 22(7), 136–155.
- Halal Development Corporation. (2022). Halal industry master plan 2030 (HIMP 2030).
- Hanafi, A. G., Ahmad, H. H. B., Mansor, M. F., & Mustafa, W. A. (2023). An integrated approach in empowering technical and vocational education and training (TVET) for Malaysian Asnaf in the IR4.0 era. *Online Journal for TVET in Asia*, 8(1), 23–
- Hasson, F., Keeney, S., & McKenna, H. (2025). Revisiting the Delphi technique-Research thinking and practice: A discussion paper. *International Journal of Nursing Studies*, 168, 105119. <https://doi.org/10.1016/j.ijnurstu.2025.10511937>

- Harun, N. H., Haji Abdullah, M. A. N. H., Wong, M. S. M. A., Mamat, N. & Moidin, S. (2021). Hala training: Issues and challenges from trainers' perspectives in Halal Products Research Institute (HPRI). *Jurnal Pengajian Islam*, 14(2), 207–216.
- Hashim, N. H., Kamarulzaman, N. H., Rahman, S. A., Othman, M. (2020). Relationships among awareness, knowledge, and attitude regarding behavioural intention towards halal jobs among Malaysian Muslim university students. *Journal of Halal Industry & Services*, 3(1). <https://doi.org/10.36877/jhis.a0000152>
- Hennida, C., Nauvarian, D., Saptari, N. O., & Putri, R. S. (2024). The role of belief systems and misperceptions in halal tourism policy: Evidence from Indonesia. *Cogent Social Sciences*, 10(1). <https://doi.org/10.1080/23311886.2024.2352915>
- Hewege, C., & Perera, C. (2020). The impact of religio-cultural institutional hegemony on Sri Lankan (halal) supply chains: Theorising the interplay between the certification body, social institutions, and the government. *Journal of Muslim Minority Affairs*, 40(3), 351–370.
- Ibrahim, M. I., Jamaludin, M. A., Kartika, B., Has-Yun Hashim, Y. Z. (2024). Challenges in the employability of halal studies graduates in Malaysia. *Journal of Halal Science and Technology*, 3(1), 10–27.
- Ibrahim, I., Shuib, A., & Yusoff, F. H. (2024). Planning of critical halal compliance control points and IoT integration in the halal chicken meat supply chain traceability system. *Journal of Halal Industry & Services*, 7(1), a0000568. <https://doi.org/10.36877/jhis.a0000568>
- Ibrahim, N. N., Ayub, A. F. M., & Yunus, A. S. M. (2020). Impact of higher-order thinking skills (HOTS) module based on the cognitive apprenticeship model (CAM) on students' performance. *International Journal of Learning, Teaching and Educational Research*, 19(7), 246–262. <https://doi.org/10.26803/ijlter.19.7.14>
- Jaya, S., Zaharudin, R., Hashim, S. N. A., Ithnin, M. A., Zaid, S. M., Mapjabil, J., & Nordin, M. N. (2021). Employing design and development research (DDR) approach in designing next generation learning spaces (NGLS) in teachers' pedagogy and technology tools. *Review of International Geographical Education (RIGEO)*, 11(7), 1237–1246. <https://doi.org/10.48047/rigeo.11.07.116>
- Koo, T. K., & Li, M. Y. (2016). A guideline for selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine*, 15(2), 155–163. <https://doi.org/10.1016/j.jcm.2016.02.012>
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607–610.
- Lewis, T. (2022). Competency-based education and the challenge of assessment in vocational training. *Journal of Vocational Education & Training*, 74(4), 475–495. <https://doi.org/10.1080/13636820.2021.1889629>
- Lim, T., Gottipati, S., Cheong, M. L. F., Ng, J. W., & Pang, C. (2023). Analytics-enabled authentic assessment design approach for digital education. *Education and Information Technologies*, 28, 9025–9044. <https://doi.org/10.1007/s10639-022-11527/1>
- Low, C. W., & Mah, P. Y. (2024). The overeducation dilemma: Graduate skill mismatch in Malaysia's labour market. *International Journal of Business, Economics and Law*, 33(1), 60–80.
- Mager, R. F. (1962). *Preparing instructional objectives*. Fearon Publishers.
- Malaysia TVET Council. (2024). *Dasar TVET Negara 2030*. Putrajaya: Ministry of Human Resources.
- Malaysian Qualifications Agency. (2024). *Malaysian qualifications framework (MQF) Second Edition (2024)*. <https://www.mqa.gov.my/>
- Md Nawi, N. H., Megat Ahmad, P. H., Ibrahim, H. & Mohd Suki, N. (2023). Firms' commitment to halal standard practices in the food sector: Impact of knowledge and attitude. *Journal of Islamic Marketing*, 14(5): 1260–1275.
- Mohamed, Y. H., Abdul Fattah, M. F., Hassan, A. M., Rani, M. H., & Puteh, F. (2024). Impact of halal supply chain management on halal integrity in Malaysia's TVET food industry. *Journal of Technical Education and Training*, 16(2), 231–240.
- Mohd Noor, N., Azmib, N. A. N., Hanifahb, N. A., & Zamarudi, Z. (2023). Navigating the halal food ingredients industry: Exploring the present landscape. *Halalsphere*, 3(2), 133–150.
- Mohd Yunos, A. R. A., Sarobo, Z., Mohd Ropi, N. A., Rosli, M. A., Abd Rashid, S. N. A., & Othman, N. Z. (2025). Assessing the perceptions of halal certification among small and medium enterprises in the food and beverage industry in Johor, Malaysia. *UMRAN – Journal of Islamic and Civilizational Studies*, 12(2), 01–13. <https://doi.org/10.11113/umran2025.12n2.726>
- Nayan, S., & Nayan, S. (2024). The importance of employability skills for TVET and non-TVET graduates. *Jurnal Intelek*, 19(2), 88–105. <http://10.24191/ji.v19i2.26513>
- Nik Mohd Rosli, N. R., Huda, F. H., Ahmad Fadzillah, N., YZH-Y Hashim, & Ahmad, A. N. (2022). A conceptual core competency model for halal executives in food manufacturing companies. *Journal of Halal Science and Technology*, 1(1), 1–14.
- Omar, N. A., Ismail, A. G., & Ab Rahman, S. (2023). Halal assurance practices in foodservice training institutions: A Malaysian perspective. *Journal of Islamic Marketing*, 14(1), 102–118. <https://doi.org/10.1108/JIMA-01-2022-0012>
- Ozturk, B. (2024). Art of food: Systematic literature review of culinary creativity. *International Journal of Gastronomy and Food Science*, 36, 100940. <https://doi.org/10.1016/j.ijgfs.2024.100940>
- Pallant, J. (2020). *SPSS survival manual: A step-by-step guide to data analysis using IBM SPSS (7th ed.)*. Routledge. <https://doi.org/10.4324/9781003117452>

- Richey, R. C., & Klein, J. D. (2014). Design and development research. In J. M. Spector, M. D. Merrill, J. Elen & M. J. Bishop (Eds.), *Handbook of Research on Educational Communications and Technology* (pp. 141–150). Springer. https://doi.org/10.1007/978-1-4614-3185-5_12
- Rofiah, K., Safira, M. E., & Rosele, M. I. (2024). The effectiveness of accelerating Halal product certification: Regulations and companions. *Journal of Human Rights, Culture and Legal System*, 4(2), 449–476. <https://doi.org/10.53955/jhcls.v4i2.203>
- Saipudin, N. A., & Suhairom, N. (2021). What else matters? Competency of Malaysian educators in technical and vocational education: A scoping review. *Online Journal for TVET Practitioners*, 6(1), 4–20. <https://doi.org/10.30880/ojtp.2021.06.01.004>
- Shafie, S., & Othman, M. N. (2022). Halal certification: An integrated approach for quality assurance. *International Journal of Halal Research*, 4(2), 55–70. <https://doi.org/10.18517/ijhr.4.2.55>
- Shah, F. M., & Bakri, M. Z. (2024). Halal restaurant and pork-free concept awareness among young Muslims in Kota Kinabalu, Sabah. *Advanced International Journal of Business Entrepreneurship and SMEs*, 6(21), 01–15. <https://doi.org/10.35631/AIJBES.621001>
- Shah, A. A., Abu Bakar, E., Muhammad Arif, A. M., & Zainal Badari, S. A. (2024). Improving halal compliance in Malaysia: The role of motivation and organisational readiness for change in small and micro-firms. *Journal of Muamalat and Islamic Finance Research*, 21(2), 150–168. <https://doi.org/10.33102/jmifr.625>
- Shaharuddin, F. Z. (2025). Integrating sertu into halal supply chains: Compliance, contamination prevention, and transparency. *Journal of Management & Muamalah*, 15(1), e232. <https://doi.org/10.53840/jmm.v15i1.232>
- Shahidan, N., & Amid, A. (2023). Challenges faced by halal meat industry: A review. *Halalsphere*, 3(1), 55–63. <https://doi.org/10.31436/hs.v3i1.61>
- Suhairom, N., Musta'amal, A. H., Amin, N. F. M., & Johari, N. (2019). Competency model for culinary arts vocational education: A mixed-method approach. *Journal of Technical Education and Training*, 11(1), 151–158. <https://doi.org/10.30880/jtet.2019.11.01.018>
- ten Hove, D., Jorgensen, T. D., & van der Ark, L. A. (2024). Updated guidelines on selecting an intraclass correlation coefficient for interrater reliability, with applications to incomplete observational designs. *Psychological Methods*, 29(5), 967–979. <https://doi.org/10.1037/met0000516>
- Tukiran, N., Abidin, N., & Ahmad, A. (2025). Identifying gaps in halal talent development and management in Malaysia: A systematic literature review. *al-Qanatr: International Journal of Islamic Studies*, 34, 78–81. <https://doi.org/10.64757/alqanatr.2025.3401/973>
- Voak, A., Fairman, B., & Wahyuni, H. C. (2023). Halal supply chain competencies: A framework for human capability development. *Journal of Resilient Economies*, 3(2). <https://doi.org/10.25120/jre.3.2.2023.4021>
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press. <https://doi.org/10.2307/j.ctvjf9vz4>
- Yaakob, N. F., Talib, M. S. A., & Yusof, M. H. (2022). Challenges in embedding halal practices in culinary education: Voices from Malaysian TVET instructors. *Journal of Technical and Vocational Education*, 19(2), 33–47.
- Yusop, S. R. M., Rasul, M. S., Yasin, R. M., Hashim, H. U., & Jalaludin, N. A. (2022). Assessment approaches and learning outcomes in technical and vocational education: A systematic review using PRISMA. *Sustainability*, 14(9), 5225. <https://www.mdpi.com/2071-1050/14/9/5225>
- Zulkifli, N., Hashim, H., & Mahbub, R. (2019). Halal education: A framework to enhance knowledge and awareness among TVET trainees. *Journal of Technical Education and Training*, 11(4), 103–110.