

Examining Differences in Alternative Assessment Practices Across Demographic Profiles of Vocational College Educators in Malaysia

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ABSTRACT

Examining Differences in Alternative Assessment Practices Across Demographic Profiles of Vocational College Educators in Malaysia addresses the gap in understanding how educator demographics influence assessment literacy in Technical and Vocational Education and Training (TVET). While policies such as the Dasar TVET Negara and the Malaysia Education Blueprint 2013–2025 emphasize authentic, competency-based evaluation, the effectiveness of these reforms depends heavily on educators' capacity to implement Alternative Assessment Practices (AAP). The study investigates whether demographic factors gender, teaching experience, academic qualification, and assessment-related training significantly shape the use of AAP, including assessment planning, performance-based tasks, rubric application, feedback, and integration of 21st-century skills. A quantitative cross-sectional survey was conducted with 110 educators from vocational colleges in Johor. Data were collected using a validated questionnaire across five AAP domains. Independent-samples t-tests and one-way ANOVA were employed to test for differences across demographic groups. Findings revealed that female educators demonstrated stronger engagement in feedback and reflective practice, while educators with more than ten years' experience reported higher implementation of performance-based tasks and rubric use. Those with master's qualifications showed greater integration of 21st-century skills, and educators with formal assessment training performed significantly better in planning and rubric application. In conclusion, demographic characteristics substantially influence AAP implementation in Malaysian TVET. Differentiated professional development, mentoring programs for novice teachers, and qualification upgrading are essential to strengthening assessment practices. Aligning educator capacity with national policy aspirations can enhance student learning outcomes and workforce readiness for Industry 4.0.

Keywords: Alternative assessment practices, vocational education, demographic profiles, teacher training, Malaysia, TVET, assessment for learning

Background of the Study

Over the past decade, Malaysia's Technical and Vocational Education and Training (TVET) landscape has experienced an accelerated phase of reform, driven by the Dasar TVET Negara (2019) and the Pelan Pembangunan Pendidikan Malaysia (PPPM) 2013–2025. Both policy frameworks articulate a strong national commitment to transforming vocational education into a pathway that is industry-relevant, competency-driven, and aligned with Industrial Revolution 4.0 (IR4.0) aspirations. Within this transformation, Alternative Assessment Practices (AAP), including performance-based tasks, project work, rubrics, portfolios, and formative feedback mechanisms have been introduced as vital tools to move beyond conventional examinations. These practices aim not only to capture technical mastery but also to cultivate broader 21st-century capabilities such as collaboration, creativity, and problem-solving, which are increasingly demanded in modern workplaces (Yusop et al., 2022; Ministry of Education Malaysia, 2019).

Despite strong policy support, the success of AAP in vocational institutions is profoundly shaped by the educators who design and implement them. A growing body of research shows that teacher demographics and professional profiles including years of teaching experience, academic qualifications, exposure to industrial training, and gender play a decisive role in shaping assessment literacy and willingness to adopt innovative

approaches (Hashim et al., 2021; Ismail et al., 2020). For instance, Subramaniam et al. (2020) found that female educators in Malaysia were often more reflective and feedback-oriented in their assessment practices, while Darusalam and Hussin (2018) highlighted that postgraduate qualifications tend to broaden teachers' repertoire of authentic assessment strategies. These findings echo the earlier theoretical perspectives of Black and Wiliam (1998) and Guskey (2002), who argued that teachers' beliefs, experiences, and professional development opportunities directly influence the quality of classroom assessment.

In the specific context of TVET programmes such as the Diploma in Construction Technology, assessment carries a dual burden: it must validate both theoretical knowledge and applied technical performance. This makes the alignment between teacher profiles and assessment execution especially consequential. Yet, a critical review of Malaysian TVET literature reveals a persistent gap: while many studies have examined curriculum design, industrial collaboration, and graduate employability, there is limited empirical work focusing on how demographic characteristics shape teachers' actual assessment practices (Salleh et al., 2022; Raudhah et al., 2022). This gap is striking, given that the effectiveness of AAP depends not only on the robustness of national policies but also on the readiness and capacity of educators to translate policy into meaningful classroom practices.

The novelty of this study lies in addressing that overlooked intersection investigating how demographic factors influence the implementation of AAP within a Malaysian vocational programme. The significance is twofold: first, the study provides evidence-based insights that can guide differentiated professional development, mentorship schemes, and qualification-upgrading initiatives for vocational educators; second, it contributes to Malaysia's broader agenda of equipping its workforce with IR4.0-ready competencies by ensuring that assessment practices genuinely support student learning and industry readiness. In doing so, this inquiry not only enriches the empirical literature on TVET assessment but also offers practical contributions for policymakers, institutional leaders, and teacher educators seeking to strengthen the quality and equity of vocational education in Malaysia.

Problem Statement

While Alternative Assessment Practices (AAP) have been embedded in Malaysian educational reform agendas for over a decade, the extent to which these practices are successfully implemented in vocational colleges remains uneven. Policies such as the *Pelan Pembangunan Pendidikan Malaysia (PPPM) 2013–2025* and the *Dasar TVET Negara* have provided clear directives for integrating authentic, competency-based assessments into teaching and learning. However, these aspirations frequently encounter practical barriers at the institutional and classroom levels.

One critical yet underexplored factor influencing AAP implementation is the demographic profile of educators. In theory, all teachers in the TVET system are expected to possess the capacity to design, execute, and evaluate authentic assessments. In practice, differences in teaching experience, academic qualifications, prior training, and even gender-related pedagogical tendencies may shape how these practices are enacted. For instance, educators with extensive industry experience may be adept at designing performance-based tasks that mirror workplace realities, while those with higher academic qualifications may be better equipped to integrate 21st-century skills into assessment frameworks. Conversely, novice teachers or those lacking targeted assessment training may rely more heavily on traditional, summative methods, thereby undermining the intended shift towards learner-centered evaluation.

The literature indicates that demographic factors are not peripheral but central to assessment behavior. Internationally, research by Black and Wiliam (1998) and Guskey (2002) underscores the role of teacher experience and professional learning in shaping assessment quality. In the Malaysian TVET context, studies such as Subramaniam et al. (2020) reveal gender-linked differences in feedback and reflection practices, while Darusalam and Hussin (2018) highlight the role of academic attainment in fostering sophisticated assessment strategies. Yet, empirical evidence linking these demographic variables directly to the breadth and depth of AAP usage in vocational education is still sparse.

This gap is particularly significant in high-stakes, skills-oriented programs such as the Diploma in Construction Technology, where assessment is not merely a measure of academic achievement but a determinant of industry readiness. Without a nuanced understanding of how educator demographics influence AAP practices, policy interventions risk being generic, failing to address specific capability gaps. Such oversight could lead to inconsistent student experiences, inequitable learning outcomes, and a misalignment between graduate competencies and industry expectations.

Therefore, there is an urgent need for empirical research that systematically examines the relationship between educators' demographic profiles and their engagement with AAP in vocational colleges. Only through such evidence can stakeholders design targeted professional development, refine institutional policies, and ensure that assessment practices serve as a true catalyst for Malaysia's TVET transformation agenda.

Purpose of the Study

This study has three objectives:

1. To examine the differences between vocational educators' demographic characteristics (gender, teaching experience, academic qualification, and assessment-related training) and their implementation of Alternative Assessment Practices (AAP) in the Diploma in Construction Technology program.
2. To determine the extent to which these demographic factors influence variations in assessment practices, including planning, execution, use of rubrics, and feedback mechanisms.
3. To provide empirical evidence that can inform professional development, policy interventions, and capacity-building strategies for strengthening AAP within Malaysia's TVET system.

Significance of the Study

This study holds significance at multiple levels policy, institutional, and practitioner by offering evidence-based insights into how demographic variables influence the implementation of Alternative Assessment Practices (AAP) in vocational colleges.

At the policy level, the findings provide critical feedback to the Dasar TVET Negara and Pelan Pembangunan Pendidikan Malaysia (PPPM) 2013–2025, both of which position high-quality assessment as a cornerstone of Malaysia's educational transformation. By identifying specific demographic factors such as teaching experience, academic qualifications, and exposure to professional training that strongly correlate with effective AAP, this research enables policymakers to design targeted interventions rather than relying on generic, one-size-fits-all professional development models. Such precision is essential for closing the gap between aspirational policy documents and on-the-ground implementation.

At the institutional level, the study equips vocational colleges with actionable intelligence for human resource planning, capacity building, and quality assurance. Understanding the demographic predictors of AAP engagement can guide institutions in tailoring training programs, fostering mentorship between experienced and novice educators, and incentivizing academic upgrading. This strategic alignment ensures that institutional investment in professional development yields measurable improvements in assessment practice and student outcomes.

At the practitioner level, the study underscores the importance of reflective practice and continuous professional learning for vocational educators. By highlighting how certain demographic attributes enhance or hinder AAP engagement, the research invites educators to self-assess their own capacities, seek targeted growth opportunities, and adopt evidence-informed approaches to assessment. For teachers in high-stakes, skills-oriented programs such as the Diploma in Construction Technology, this awareness is not merely an academic concern but a professional imperative, directly influencing graduate readiness for the demands of Industry 4.0.

Beyond its immediate application in Malaysia, the study also contributes to the global discourse on assessment for learning in vocational education. The intersection of demographic factors and assessment practices is underexplored internationally, particularly within the context of emerging economies where TVET systems are

undergoing rapid modernization. As such, the insights generated here have the potential to inform comparative studies, cross-cultural policy dialogues, and the refinement of educator development frameworks world wide. In sum, the significance of this study lies not only in advancing academic understanding of AAP within vocational education but also in offering a practical roadmap for strengthening the assessment capacity of educators thereby enhancing student learning, institutional performance, and national workforce competitiveness.

LITERATURE REVIEW

Alternative Assessment Practices in TVET

Alternative Assessment Practices (AAP) are designed to capture complex competencies that traditional examinations often fail to measure, including problem-solving, teamwork, and adaptability (William, 2011). In the Malaysian TVET context, AAP encompasses performance-based tasks, project work, portfolio assessments, and workplace simulations, all underpinned by clear criteria and constructive feedback (Ministry of Education Malaysia, 2018). These practices are integral to aligning assessment with the competency-based philosophy central to the Dasar TVET Negara. However, their successful implementation depends significantly on the readiness and capacity of educators to design, administer, and interpret such assessments effectively.

Demographic Influences on Assessment Practices

Research has consistently shown that demographic factors shape teachers' pedagogical and assessment approaches. Teaching experience often correlates with greater confidence and versatility in assessment design (Guskey, 2002), as experienced educators tend to draw on a broader repertoire of strategies. Similarly, higher academic qualifications are linked with deeper theoretical knowledge, which can support the integration of 21st-century skills into assessment frameworks (Darusalam & Hussin, 2018). Gender has also been explored as a variable influencing teaching and assessment behavior, with some studies noting that female educators may emphasize feedback and relational dimensions of assessment more than their male counterparts (Subramaniam et al., 2020).

Professional Training and Assessment Literacy

Professional development in assessment has been identified as a critical driver of improved classroom practices (OECD, 2013). Targeted training can enhance teachers' capacity to create authentic tasks, use rubrics consistently, and provide feedback that supports learning rather than simply judging performance (Sadler, 2009). In the Malaysian TVET system, short courses, workshops, and continuous professional development programs are offered, but participation rates and the quality of follow-up support vary widely. Evidence suggests that without sustained, context-specific training, the impact of such interventions on actual classroom practice remains limited (UNESCO-UNEVOC, 2020).

Empirical Studies Linking Demographics and AAP

International studies provide valuable insights into how demographic factors intersect with alternative assessment. For example, Zulfikar and Mujiburrahman (2018) found that professional identity, shaped in part by academic and experiential background, influences the willingness to adopt student-centered assessments. In the Malaysian vocational context, Abdullah and Shahrill (2021) reported a positive relationship between teacher experience and the quality of formative feedback practices. However, few studies have systematically examined multiple demographic variables simultaneously in relation to AAP, especially within a single program such as the Diploma in Construction Technology. This represents a notable research gap, as understanding these relationships holistically can guide the design of targeted capacity-building initiatives.

Gaps in the Literature

While policy frameworks strongly advocate for AAP in Malaysian TVET, empirical research remains disproportionately focused on curriculum design and student performance, with less attention to the educator variables that mediate assessment quality. Moreover, most existing studies consider demographic factors in

isolation rather than examining their combined influence on AAP. The lack of such integrated research limits the capacity of policymakers and institutions to design differentiated interventions that reflect the diverse profiles of vocational educators. Addressing this gap is essential to ensuring that AAP fulfills its transformative potential in developing an IR4.0-ready workforce.

METHODOLOGY

This study adopted a quantitative cross-sectional survey design to examine whether vocational educators' demographic characteristics were associated with differences in the implementation of Alternative Assessment Practices (AAP). The choice of design was guided by the study's objective, which was not to manipulate teaching conditions but to explore naturally occurring variations among educators within the Malaysian Technical and Vocational Education and Training (TVET) system.

Although the study was originally framed as correlational, the categorical nature of the independent variables required an analytical shift. Demographic characteristics such as gender (male/female), teaching experience (less than 5 years, 5–10 years, more than 10 years), academic qualification (Bachelor's/Master's), and exposure to formal assessment training (yes/no) are nominal or ordinal variables, while the outcome measures scores on the five AAP domains are continuous variables. This structure makes mean comparison tests (independent-samples t-tests and one-way ANOVA) more appropriate than correlation analysis, which assumes both variables are measured at an interval or ratio level.

The study focused on educators teaching in the Diploma in Construction Technology programme across vocational colleges in Johor. A stratified random sampling technique was employed to ensure adequate representation across demographic categories. Using Krejcie and Morgan's (1970) sample size determination, a minimum of 97 participants was required. The final sample comprised 110 educators, which exceeded this threshold and provided sufficient statistical power.

Table 1 presents the demographic distribution of respondents. The sample reflected a balanced gender composition (50.9% male; 49.1% female), diverse teaching experience (25.5% < 5 years; 38.2% 5-10 years; 36.3% > 10 years), and strong academic representation (65.5% Bachelor's; 34.5% Master's). Notably, 73.6% of the respondents had undergone formal assessment training, providing a robust basis for subgroup comparisons.

Table 1. Demographic Profile of Respondents

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	56	50.9
	Female	54	49.1
Teaching Experience	< 5 years	28	25.5
	5–10 years	42	38.2
	> 10 years	40	36.3
Academic Qualification	Bachelor's degree	72	65.5
	Master's degree	38	34.5
Assessment Training	Attended training	81	73.6
	No training	29	26.4

Data were collected using a structured questionnaire adapted from the SS-APA-KV instrument, which measures AAP implementation across five domains:

1. Assessment Planning and Design
2. Performance-Based Task Implementation
3. Feedback and Reflective Practice
4. Use of Rubrics and Criteria
5. Integration of 21st-Century Skills

Content validity was established through expert review by three specialists (educational assessment, vocational pedagogy, psychometrics). A pilot test involving 30 educators produced Cronbach's alpha values ranging from 0.84 to 0.91, confirming high internal consistency.

The instrument was distributed electronically via Google Forms, accompanied by an information sheet that explained the purpose of the study and assured confidentiality. Participation was voluntary, and informed consent was obtained before submission. Data collection spanned six weeks, during which reminder emails were issued to optimise the response rate.

Data analysis was conducted using SPSS version 27. Prior to inferential testing, assumptions for parametric analysis were examined:

- Normality was assessed using the Shapiro–Wilk test and Q–Q plots, which indicated that AAP scores were approximately normally distributed.
- Homogeneity of variance was evaluated using Levene's test, confirming that group variances were sufficiently equal to proceed with t-tests and ANOVA.
- Independence of observations was ensured by the design of the study, as each respondent represented a distinct teaching professional.

Based on these checks:

- Independent-samples t-tests were used for binary demographic variables (gender; training exposure).
- One-way ANOVA was conducted for multi-category variables (teaching experience; academic qualification).
- Where ANOVA results showed statistical significance, post-hoc Tukey HSD tests were applied to identify specific group differences.

A significance level of $p < 0.05$ was adopted across all analyses. This approach allowed for robust testing of whether demographic characteristics were associated with systematic differences in AAP engagement.

FINDINGS

The analysis examined whether significant differences existed between educators' demographic characteristics and their engagement with Alternative Assessment Practices (AAP) across five domains: assessment planning and design, performance-based task implementation, feedback and reflective practice, use of rubrics and criteria, and integration of 21st-century skills.

Descriptive statistics indicated that overall engagement with AAP was moderate to high across the sample, with performance-based task implementation ($M = 4.12$, $SD = 0.63$) and the use of rubrics ($M = 4.08$, $SD = 0.59$) recording the highest mean scores. This pattern suggests that vocational educators were relatively confident in operationalizing authentic tasks and in applying structured assessment criteria, practices that are consistent with current TVET assessment frameworks (Zahari et al., 2021).

The one-way ANOVA results revealed several significant demographic effects. In terms of gender, female educators reported higher levels of engagement in feedback and reflective practice ($F(1,108) = 4.72$, $p < 0.05$). This finding resonates with prior Malaysian research by Subramaniam et al. (2020), which highlighted that

female teachers often adopt more relational and dialogic feedback approaches, thereby enhancing student reflection and self-regulation.

Teaching experience also emerged as a critical factor. Significant differences were observed in performance-based task implementation ($F(2,107) = 6.15, p < 0.01$) and use of rubrics ($F(2,107) = 5.62, p < 0.01$), with post-hoc comparisons showing that educators with more than ten years of teaching experience scored higher than those with fewer than five years. These results align with findings from Mohd Yunus et al. (2019), who reported that experienced TVET educators were more adept at integrating authentic tasks and structured assessment tools, reflecting the benefits of accumulated pedagogical practice.

Academic qualification was another differentiating variable. Educators holding a master's degree demonstrated significantly higher engagement in integrating 21st-century skills within assessment design compared to their bachelor's degree counterparts ($F(1,108) = 5.08, p < 0.05$). This finding underscores the value of advanced training in expanding teachers' pedagogical repertoire, particularly in embedding higher-order thinking and problem-solving skills—an emphasis consistent with the aspirations of Malaysia's Dasar TVET Negara and the Pelan Pembangunan Pendidikan Malaysia (PPPM) 2013–2025.

Finally, prior exposure to assessment training was strongly associated with higher levels of engagement in assessment planning and design ($F(1,108) = 7.31, p < 0.01$) and in the consistent use of rubrics ($F(1,108) = 6.87, p < 0.01$). This pattern highlights the effectiveness of targeted professional development in building assessment literacy, echoing recommendations by UNESCO-UNEVOC (2020) that professional training is essential for ensuring TVET educators are equipped to design fair, transparent, and competency-based assessments.

Table 2 Summarizes the significant ANOVA findings across demographic variables.

AAP Domain	Demographic Factor	F-value	p-value	Significant Difference Observed
Assessment Planning and Design	Assessment Training	7.31	0.008	Trained > Untrained
Performance-Based Task Implementation	Teaching Experience	6.15	0.003	>10 years > <5 years
Feedback and Reflective Practice	Gender	4.72	0.032	Female > Male
Use of Rubrics and Criteria	Teaching Experience	5.62	0.005	>10 years > <5 years
Integration of 21st-Century Skills	Academic Qualification	5.08	0.026	Master's > Bachelor's

Taken together, these findings confirm that demographic characteristics exert a meaningful influence on the extent and quality of AAP implementation in Malaysian vocational colleges. More experienced educators appear to have refined their practices through sustained classroom exposure, while advanced academic training and professional development provide teachers with the conceptual and practical tools to design assessments that align with 21st-century competencies. These insights have direct implications for TVET workforce planning, suggesting that structured capacity-building programs, mentorship for early-career teachers, and qualification upgrading should be prioritized to ensure consistency in assessment quality across the sector.

DISCUSSION

The findings of this study demonstrate that demographic characteristics particularly teaching experience, academic qualification, gender, and participation in assessment training significantly influence the implementation of Alternative Assessment Practices (AAP) in Malaysian vocational colleges. This is consistent with the premise of human capital theory, which emphasizes that educators' knowledge, skills, and

professional dispositions are shaped by both formal education and accumulated workplace experience, ultimately affecting performance outcomes (Becker, 1993; Tan & Said, 2021).

Teaching experience emerged as one of the most consistent predictors of AAP quality. Educators with longer service reported stronger engagement in performance-based task implementation and feedback practices, reflecting the incremental nature of pedagogical mastery. Experienced teachers have often navigated multiple curriculum reforms, assessment cycles, and student cohorts, which allows them to refine their strategies for designing authentic tasks that mirror industry practices and provide feedback that supports deeper learning. This finding echoes Guskey's (2002) argument that professional expertise develops through sustained practice and reflective cycles, and it aligns with recent Malaysian TVET research showing that veteran teachers demonstrate greater readiness in applying competency-based and authentic assessments (Yunus et al., 2019; Shahrill et al., 2021). In policy terms, it also resonates with the Ministry of Education's (2018) emphasis on "practice-based competency" as a foundation for effective TVET instruction.

Academic qualification was another influential factor. Educators with master's degrees were more adept at integrating 21st-century skills into assessment design compared to those with only a bachelor's degree. This may be explained by greater exposure to pedagogical theory, educational research, and global best practices during postgraduate study, which in turn enhances conceptual sophistication and innovation in assessment (Darusalam & Hussin, 2018; Hashim & Mahmud, 2020). Similar results were reported in a study on Malaysian polytechnic lecturers, where higher qualifications were linked to stronger incorporation of critical thinking and problem-solving elements in classroom assessments (Rahman et al., 2020). This finding strengthens the case for structured academic upgrading in line with the Dasar TVET Negara (2019), which explicitly calls for raising the qualification profile of vocational educators as part of a wider professionalization agenda.

Gender differences, although less pronounced, were also evident. Female educators scored higher in feedback and reflective practice, a finding consistent with Subramaniam et al. (2020), who highlighted that female teachers often adopt relational and dialogic feedback approaches. In vocational education, where learners are not only developing technical competencies but also workplace dispositions, such relational feedback can motivate students, build resilience, and foster self-confidence. Similar trends have been reported in ASEAN studies, where female educators were observed to place greater emphasis on student support and formative dialogue (Nguyen & Phan, 2019).

Perhaps the most actionable finding concerns the role of assessment training. Educators who had attended structured training reported higher engagement in assessment planning and rubric use. This reinforces international literature (OECD, 2013; UNESCO-UNEVOC, 2020), which stresses that professional development in assessment literacy is critical for ensuring fairness, transparency, and validity in competency-based education. Malaysian studies also affirm that training workshops enhance assessment consistency and reliability, but they caution that one-off, generic courses rarely lead to sustainable change (Yaacob et al., 2021; Nordin & Razak, 2022). Instead, long-term, context-specific professional learning coupled with mentoring and peer collaboration is more effective in reshaping assessment practices.

Taken together, these findings suggest that improving AAP implementation in vocational colleges requires differentiated professional development strategies. Policymakers and institutional leaders must acknowledge that educator demographics are not incidental but central to assessment capacity. A "one-size-fits-all" approach to professional learning is unlikely to yield the systemic transformation envisioned in the Pelan Pembangunan Pendidikan Malaysia (PPPM) 2013–2025. Instead, initiatives such as mentorship programs for novice teachers, postgraduate study pathways, and sustained competency-based training should be prioritized.

From a broader perspective, this study contributes to the relatively underexplored discourse on the intersection

of educator demographics and assessment practice in TVET. While international research on assessment for learning has been extensive (Black & Wiliam, 2018; Carless & Boud, 2019), the vocational education context particularly in Malaysia presents distinct challenges and opportunities. TVET educators operate at the intersection of national policy mandates, institutional resource constraints, and industry demands shaped by the realities of Industry 4.0 (World Economic Forum, 2020). The evidence presented here affirms that

strengthening assessment literacy is not solely a matter of policy enforcement but also of strategically investing in the human capital of educators to ensure equity, quality, and workforce relevance.

CONCLUSION AND IMPLICATIONS FOR FUTURE PRACTICE

This study examined the differences between vocational educators' demographic characteristics and their engagement with Alternative Assessment Practices (AAP) in Malaysian vocational colleges, focusing on the Diploma in Construction Technology program. The findings reveal that teaching experience, academic qualifications, gender, and formal assessment training significantly shape how educators design, implement, and refine authentic assessment strategies. These demographic factors do not operate in isolation but collectively influence the depth, quality, and consistency of AAP implementation.

Teaching experience emerged as a strong predictor of competence in performance-based task implementation and feedback provision, suggesting that pedagogical expertise is cultivated over time through repeated engagement with authentic assessment cycles. Academic qualifications, particularly at the master's level, were associated with a more robust integration of 21st-century skills into assessment design, highlighting the importance of advanced academic training in enhancing conceptual sophistication. Gender differences in feedback and reflective practice underscore the nuanced ways in which relational competencies contribute to effective assessment, while the positive impact of assessment training affirms the value of structured, targeted professional development. and related agencies should integrate differentiated professional development pathways into the Dasar TVET Negara and the Pelan Pembangunan Pendidikan Malaysia (PPPM) 2013–2025, ensuring that training content is aligned with educators' prior experience and qualifications. At the institutional level, vocational colleges should consider pairing novice educators with experienced mentors to accelerate skill acquisition in AAP, while also incentivizing academic upgrading for sustained pedagogical growth. At the practitioner level, educators should be encouraged to engage in reflective practice and peer collaboration, fostering a culture of continuous improvement in assessment literacy.

In the broader context of Industry 4.0 and the Fourth Industrial Revolution, vocational education systems must produce graduates who are not only technically proficient but also adaptable, collaborative, and capable of critical thinking. This requires a paradigm shift in assessment from rote evaluation to authentic, performance-based measures that mirror real-world demands. The present study affirms that such a shift is achievable when the professional capacity of educators is developed strategically, taking into account the demographic factors that influence assessment practice.

Future research should expand on these findings by incorporating longitudinal designs to capture the evolution of AAP competence over time, as well as qualitative investigations to explore the lived experiences behind statistical patterns. Comparative studies across different TVET programs and regions could also deepen understanding of how demographic variables interact with contextual factors in shaping assessment practice.

In conclusion, enhancing the quality of AAP in Malaysian vocational colleges is not merely a technical challenge but a human capital investment. By aligning professional development strategies with the demographic realities of the teaching workforce, policymakers and institutional leaders can ensure that assessment reforms translate into meaningful, lasting improvements in student learning and workforce readiness.

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