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RESEARCH ARTICLE

Evaluation of Professional Development Program on Maritime Lecturers in Malaysian Higher Education

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ABSTRACT

Professional development of lecturers is key to enhancing educational quality, necessitating systematic evaluation of training programs. Aligning with the Malaysia Education Blueprint 2015-2025 (Higher Education), this study evaluates a workshop designed to improve competencies among maritime lecturers in Technical and Vocational Education and Training in a Malaysian institution. Using Kirkpatrick's Level 2 evaluation model, a one-group pre-test and post-test design measured changes in knowledge, skills, and attitudes among 21 lecturers. T-tests revealed significant improvements in all three areas post-training. The results support the workshop's effectiveness and guide further training program development for lecturers.

INTRODUCTION

Education serves as an instrumental component for economic and societal advancement. In Malaysia, Technical and Vocational Education and Training (TVET) has recently seen increasing emphasis. However, it often remains a less favored option for tertiary education among students (Noraini 2022). The Malaysia Education Blueprint 2015-2025 (Higher Education) outlines a dual focus on academic and TVET pathways, advocating for a transition towards outcome-centric educational methods (Ministry of Education Malaysia 2015). In this evolving educational context, the role of educators, particularly teachers and lecturers, is critical. They bear the responsibility of delivering quality education and facilitating societal progress (Khan and Haseeb 2017).

Amidst Malaysia's Economic Transformation Programme which projects a 2.5-fold increase in TVET enrolment by 2025, the urgency to scrutinize TVET educational quality is clear (Ministry of Education Malaysia 2015). Specialized educators in TVET institutions, particularly maritime lecturers, find themselves at the intersection of these shifts in educational and economic landscapes. Their roles demand not only subject-matter expertise but also proficiency in pedagogical techniques to ensure

effective knowledge transfer (Muda, Ali, and Jusoh 2017). Faculty members often possess industry backgrounds, rendering specialized training as an important aspect of their ongoing professional development (Puteh, Mada, and Hasan 2017).

Prioritizing such training programs is increasingly recognized as vital for optimizing resource efficiency in competitive academic settings (Yaghi and Bates 2020). Given the dynamic nature of educational demands, ongoing professional development has transitioned from an optional activity to a requisite one (Hofmeister and Pilz 2020). Consequently, the rigorous assessment of the effectiveness of training programs emerges as an essential component of educational quality assurance (Alsalamah and Callinan 2021).

There are inconsistencies in the outcomes of teacher training programs. Some programs have received positive reviews, yet others have shown negligible improvements (Kerwin and Thornton 2021; Loyalka et al. 2019; Berlinski and Busso 2017). In Malaysia, although numerous training programs for lecturers are available, a comprehensive evaluation of their effectiveness remains conspicuously absent (Mustafa and Hashim 2022). Recognizing this gap, the Ministry of Education in Malaysia has initiated multiple programs to enhance teaching quality. However, empirical evidence to ascertain the effectiveness of these programs remains limited (Ariffin et al. 2019; Popova et al. 2022).

To fill this research gap, the present study systematically assesses a specialized training program focused on effective teaching methods for maritime lecturers in a higher education institution in Malaysia. This study investigates the impact of this program on the enrichment of their knowledge, skills, and attitudes. The scope aligns with the Malaysia Education Blueprint 2015-2025 (Higher Education), aiming to improve both the quality and efficiency of higher education in Malaysia (Ministry of Education Malaysia 2015). Furthermore, it provides a robust empirical foundation for shaping policies and practices in TVET lecturer training on a global scale.

LITERATURE REVIEW

Kirkpatrick Model

The present study has adopted the Kirkpatrick model for the training effectiveness assessment (Figure 1). It is one of the widely used models for the training effectiveness assessment (Aryadoust 2017; Kirkpatrick and Kirkpatrick 2016; Ariffin et al. 2019; Gamtessa, Tiyare, and Kebede 2020) due to its ability to measure the effectiveness of a training program and being used in different fields such as education, medicine, civil service, communication and science (Zainol, Hashim, and Kasi 2017). It consists of four levels: Reaction, learning, behavior and result (Gamtessa, Tiyare, and Kebede 2020; Kirkpatrick and Kirkpatrick 2016; Piryani et al. 2018). However, the present study focuses on "learning" only. Relatedly, most learning assessments are concerned with knowledge, skills, and attitude (Zainol, Hashim, and Kasi 2017). According to Alsalamah and Callinan (2021), the evaluation of learning in the Kirkpatrick model is a form of internal criteria that helps researchers assess what happens within the training program. It is used to measure the participants' learning outcomes based on their attendance experience after training (Heydari et al. 2019).

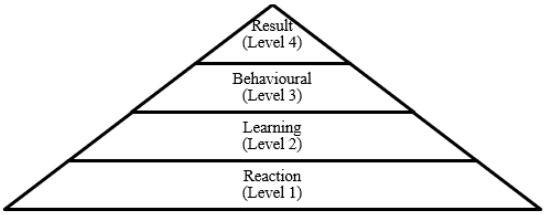

Figure 1. A simplified Kirkpatrick model.

Training Effectiveness and Learning (Knowledge, Skills, and Attitude)

This investigation focuses on the influence of training on lecturers' competencies, namely their knowledge, skills, and attitudes. The Kirkpatrick model serves as the framework for evaluating training effectiveness in this study (Figure 1). This model enjoys widespread application in diverse sectors like education, healthcare, governance, and communications (Zainol, Hashim, and Kasi 2017). Comprising four distinct stages—Reaction, Learning, Behavior, and Results—it provides a comprehensive mechanism for gauging the efficacy of training initiatives (Gamtessa, Tiyare, and Kebede 2020; Kirkpatrick and Kirkpatrick 2016; Piryani et al. 2018). This study, however, zeroes in on the 'Learning' dimension. Alsalamah and Callinan (2021) mention that the 'Learning' component within the Kirkpatrick model serves as an internal yardstick, aiding researchers in dissecting occurrences during the training.

Aligning with the focus on the 'Learning' aspect of the Kirkpatrick model, the study aims to probe the transformations in lecturers' knowledge, skills, and attitudes post-training. Alsalamah and Callinan (2021) define 'Knowledge' as the intellectual outcomes associated with how well participants grasp specific information. 'Skills' represent the technical proficiencies acquired, and 'Attitude' encapsulates the participants' valuation of the training's applicability (Kirkpatrick and Kirkpatrick 2016).

Existing empirical studies corroborate the relationship between training and enhancements in these domains. Smith and Sheridan (2019) conducted a meta-analysis revealing that such programs significantly boost teachers' competencies in family engagement. Likewise, Omar, Zahar, and Rashid (2020) showed a correlation between training and improved teacher competence in Malaysia's TVET institutions.

Within the framework of the Kirkpatrick model, prior literature indicates that effective training is likely to augment knowledge, skills, and attitudes (Sahni 2020). Methods like pre-test and post-test evaluations offer valuable insights into learning outcomes, as they permit comparisons between participants' knowledge levels before and after training (Masood and Usmani 2015; Heydari et al. 2019). Moreover, the model permits the simultaneous evaluation of multiple competencies through diverse techniques, such as group activities, interviews, and surveys, among others (Kirkpatrick and Kirkpatrick 2016; Aryadoust 2017).

Considering the foregoing literature, the study hypothesizes that:

H1: Lecturers' knowledge would significantly increase following participation in the effective teaching method training.

H2: Lecturers' skills would significantly increase following participation in the effective teaching method training.

H3: Lecturers' attitude would significantly increase following participation in the effective teaching method training.

By focusing on these hypotheses, this research aims to contribute valuable insights into the efficacy of training programs for higher education lecturers in TVET, particularly within the Malaysian context.

METHODS

This study utilized a single-group pre-test and post-test research design to rigorously evaluate the impact of a tailored teaching methods workshop for maritime lecturers at Malaysian higher education institution. Ethical approval for this study was secured from the Universiti Tunku Abdul Rahman (UTAR) Scientific and Ethical Review Committee (SERC) ref: U/SERCl39l2015. The research activities adhered to the standards and requirements of both the higher education institution where

the study was conducted and UTAR Scientific and Ethical Review Committee. All protocols, including data collection and handling, were in compliance with the ethical guidelines set forth by these entities. Before participating in the study, the lecturers were briefed about the study's objectives, methodologies, and potential ramifications. Written informed consent was obtained from each participant, expressly indicating that their data would be used for research purposes only and that they had the option to withdraw from the study at any time without any repercussions.

Phase 1: Training Needs Assessment

In the initial phase, a training needs assessment (TNA) was carried out among 70 maritime lecturers at the institution. This assessment, guided by Mohammed Saad and Mat (2013), was designed to identify areas of improvement and specific training needs for enhancing instructional delivery.

Phase 2: Workshop Implementation and Evaluation

Based on the findings from Phase 1, training modules were developed to address identified areas of need. Twenty-one lecturers were selected for a workshop focused on effective teaching methods, which was one of several workshops executed in Phase 2. The workshop aimed to enhance the lecturers' knowledge, skills, and attitudes towards effective teaching practices tailored to the student population's specific academic and contextual needs. This phase was carried out in close coordination with the institution's management and was aimed at fulfilling the explicit training needs identified in Phase 1. Of the 70 lecturers who participated in the training needs analysis survey in Phase 1, 21 were identified for the workshop on effective teaching methods. Hence, the workshop on effective teaching methods was one of the training workshops that was designed and carried out in Phase 2 based on the findings of the training needs assessment. The training workshop aimed to enhance lecturers' knowledge, skills and attitude to adopt effective pedagogical strategies and methods that matched the level of study, discipline and context of the students in the institution. This workshop on effective teaching methods was planned, designed, and executed according to the needs of the lecturers and the institution (Figure 2).

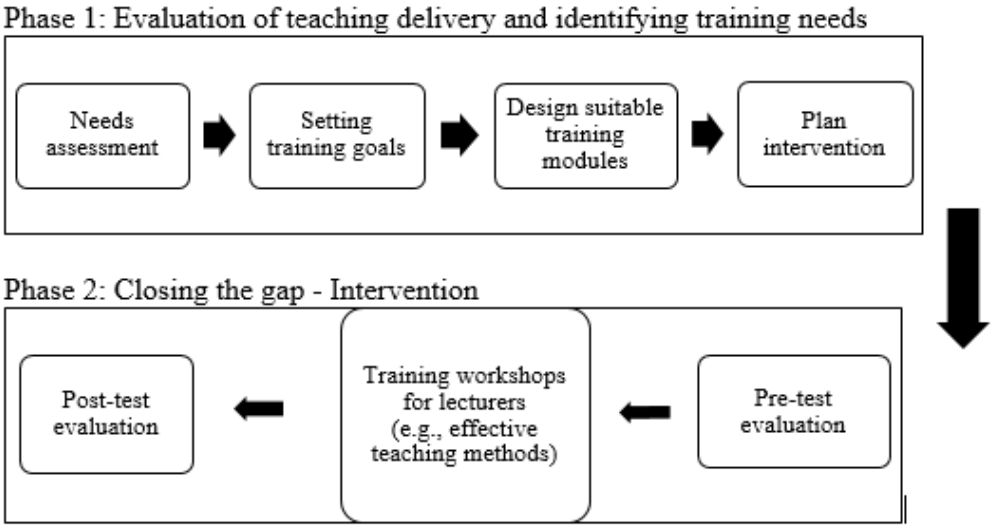

Figure 2. The flowchart of the project.

Sample

The workshop involved 21 maritime lecturers, identified through a Phase 1 training needs analysis

as candidates for training in effective teaching methods (See Table 1). All of them were male, aged from 37 to 69 years (Average: 51.76 years). In relation to teaching experience, 19 (38.1%) had been teaching for 6 to 10 years, and 2 (9.5%) had over 25 years of service. Educational qualifications among the participants varied, with three (14.3%) holding a Bachelor's, seven (33.3%) with a Master's, and one (4.7%) with a Ph.D, while the remaining 9 (42.9%) had other qualifications. Regarding professional qualifications, of the 21, 13 lecturers (61.9%) had relevant certifications, six (28.6%) had none, and two (9.5%) did not disclose this information on the questionnaire.

Table 1. Demographic statistics of the lecturers.

Description	Frequency	Percent
Years of Service		
6 - 10 years	8	38.1
11 - 15 years	5	23.8
16 - 20 years	2	9.5
21 - 25 years	4	19.0
More than 25 years	2	9.5
Total	21	100.0
Highest Academic Qualification		
Doctor of Philosophy	1	4.8
Master’s Degree	7	33.3
Bachelor’s Degree	3	14.3
Diploma	2	9.5
Certificate	4	19.0
Others	3	14.3
Not indicated	1	4.8
Total	21	100.0

Instruments

To compare the effectiveness of the training on lecturers' knowledge, skills, and attitudes, two parallel questionnaires were administered: one before the workshop (pre-test) and another after (post-test). These questionnaires each consisted of 88 items divided into three sections, designed to measure knowledge (30 items), skills (29 items), and attitudes (29 items), in line with the Kirkpatrick training evaluation model. Participants responded to these items on a 5-point Likert scale, ranging from 1 (disagree) to 5 (agree). Adapted from Heydari et al. (2019) to fit the context of this study, both pre-test and post-test questionnaires contained identical items. The only difference was the inclusion of the word "now" in the post-test items to prompt reflection on any changes post-training. For instance, a pre-test item measuring knowledge read, "I know how to define educational goals," while the post-test version stated, "Now, I know how to define educational goals."

The training on effective teaching methods

On the first day of the workshop, following participant registration, lecturers completed the pre-test questionnaire designed to evaluate their knowledge, skills, and attitudes in areas such as teaching plan design, classroom management, and student motivation. The workshop itself included a variety of activities aligned with the training objectives and informed by best practices outlined by Aryadoust (2017) and Kirkpatrick and Kirkpatrick (2016). These activities, detailed in Table 2, included group discussions and presentations aimed at assessing the lecturers' knowledge, skills, and attitudes as per the Kirkpatrick model evaluation criteria. At the conclusion of the two-day workshop, a post-test questionnaire, similar to the pre-test, was administered to gauge any changes in the participants' knowledge, skills, and attitudes as a result of the training.

Table 2. Descriptions of the effective teaching methods training at Phase 2.

Descriptions of the training		Components
Day 1	a. The effective teacher Effective teaching was defined and the key behaviours that help achieve it were emphasized.	Knowledge Attitude
	b. Understanding your students The diversity of students and teaching methods were acknowledged – Understanding that not all learners are alike.	Knowledge
	c. Goals, standards, and objectives Understanding what goals, standards, and objectives are and the three main domains of learning. The steps in preparing behavioural objectives were highlighted.	Knowledge
	d. Different Teaching Methods i. Direct Methods (Part 1) This topic comprised two parts. Part 1 was about direct methods in which lecturers were trained on direct teaching, lecture, tele-lecture, textbook lecture, and pre-recorded lecture. At the end of this topic, the lecturers presented various teaching methods. They were divided into groups. Each group comprised four to five lecturers. Each group presented the following issues: • Teaching methods that the lecturers had used in the past. • The problems and obstacles that they encountered. • The group's suggestions on teaching methods that they could use as an improvement. • The possible problems and obstacles that the lecturers may encounter and their proposed solutions to overcome these.	Knowledge Skills and Attitude
Day 2	ii. Indirect Methods (Part 2) Participants were trained to hold whole-class, small-group, and panel discussions. Participants were also trained on heuristic methods like problem-solving, discovery, inquiry, co-operative, and phenomenon-based learning.	Knowledge
	At the end of this topic, the lecturers presented indirect teaching methods. They were divided into groups. Each group comprised four to five lecturers. Each group presented the following issues: • The lecturers reflected on the indirect teaching methods they had conducted in the past. • Their opinion on whether their students could be given the freedom needed to make discovery and inquiry learning successful. • The areas of concern that must be overcome.	Skills and Attitude

RESULTS

First of all, a demographic analysis was performed using descriptive statistics. Later on, before testing the hypotheses, the study assessed the internal consistency of the data by performing a reliability analysis. As shown in Table 3, a reliability test was conducted to ascertain the internal consistency of the scales used in this study. Based on the results, all scales at the pre-test and post-test indicated good internal consistency as the Cronbach's alpha values were larger than the cut-off value of 0.70 (Pallant 2020).

Table 3. The reliability of lecturers' knowledge, skills, and attitude at pre-test and post-test

Component	Number of items	Pre-test (α)	Post-test (α)
Knowledge	30	.979	.990
Skills	29	.975	.989
Attitude	29	.988	.986

This study employed a pre-test and post-test experimental design. According to Pallant (2020), a paired-samples t-test or repeated measures are used to measure the responses of the same group of people under two different conditions. In the t-test, effect size statistics indicate the magnitude of difference in the pre-test and post-test (Pallant 2020). In this study, eta squared is calculated using the following formula:

$$\text{Eta squared} = t^2/t^2+(N-1) \quad (1)$$

As illustrated in Figure 3, the overall results indicated there was a statistically significant increase in the scores of knowledge, skills, and attitude after the training workshop. Additionally, results in Table 4 indicated that skills exhibited a greater improvement as compared to both knowledge and attitude. Specifically, lecturers' skills showed a statistically significant increase from M = 3.88, SD=.55 to M = 4.36, SD = .45; $t(20) = -3.43$, p = .003 (two-tailed). The magnitude of the differences in the means (mean difference = -.48, 95% CI: -.77 to -.19) before and after the workshop had a large effect (eta squared = 0.37). Effect size is considered large when the eta squared value is ≥.14 (Pallant 2020). The results also revealed that there was a significant increase in lecturers' knowledge from pre-workshop (M = 3.92, SD =. 53) to post-workshop (M = 4.35, SD = .46), $t(20) = -3.36$, p = .003 (two-tailed). Hence, the mean increase in lecturers' knowledge was .43 with a 95% confidence interval ranging from -.70 to -.16. Based on the results, the eta squared statistic (0.36) indicated a large effect size.

Besides, the lecturers' attitude before the workshop was M = 4.13, SD=.57, and it increased to M = 4.47, SD = .44 after the workshop. Thus, there was a statistical significance in lecturers' attitudes with a mean difference of -.34, with a 95% confidence interval ranging from -.60 to -.08, $t(20) = -2.71$, p =.013 (two-tailed). The eta squared statistic 0.27 indicated a large effect size. Based on the results, the sign negative can be ignored because the post-test average score was subtracted from the pre-test average score (Muhid et al. 2020). Consequently, it can be concluded that the results supported all hypotheses. Lecturers' knowledge, skills and attitude increased significantly following participation in the training workshop.

Table 4. Descriptive statistics and results for lecturers' knowledge, skills and attitude at pre-test and post-test.

Component	Pre-test		Post-test		Mean difference	Sig.	Effect size	Results
	Mean	SD	Mean	SD				
Knowledge	3.92	.528	4.35	.456	-0.43	.003	.360 (large)	H1 Supported
Skills	3.88	.549	4.36	.445	-0.48	.003	.370 (large)	H2 Supported

Attitude	4.13	.566	4.47	.436	-0.34	.013	.269 (large)	H3 Supported

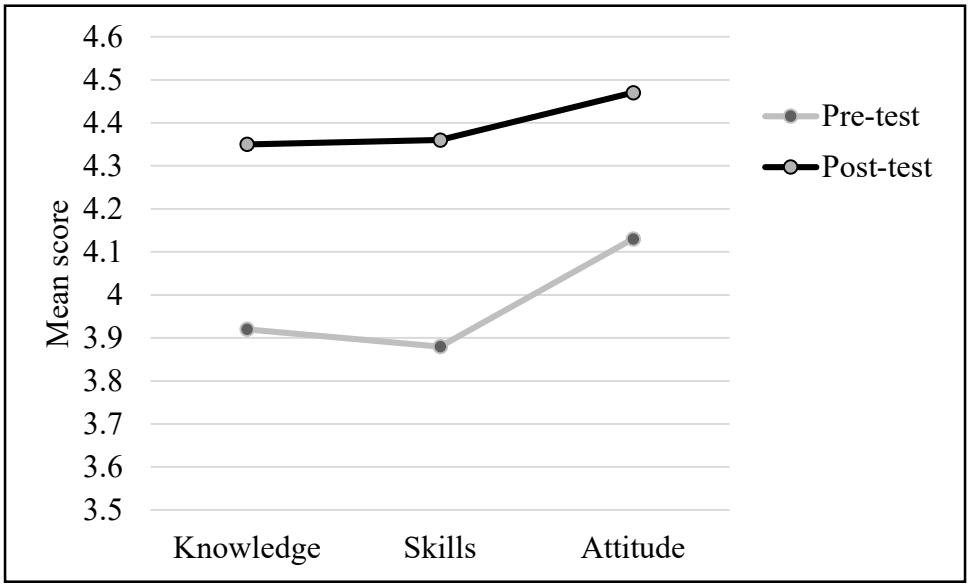

Figure 3. Differences in lecturers' knowledge, skills, and attitude at pre-test and post-test.

DISCUSSION

The aim of this study was to scrutinize the efficacy of a specialized training program designed to augment the knowledge, skills, and attitudes of maritime lecturers within a Malaysian higher education setting. Utilizing the Kirkpatrick model as a guiding framework, this study emphasized the component of "learning," which encompasses knowledge, skills, and attitudes. The study's methodology was underpinned by a needs assessment, and data was collected at two key junctures: prior to and following the training intervention.

According to the Kirkpatrick model, this study found that the training workshop successfully fostered the lecturers' knowledge, skills and attitude towards effective teaching methods. This type of training familiarises lecturers with effective teaching methods based on the reflection of their teaching experience in the institution (Heydari et al. 2019). Consistent with study, this training workshop can also help motivate teaching staff and keep them updated with the latest teaching and learning methods required by their institution. The effective training provided to the lecturers results in increased knowledge (Khan and Haseeb 2017; Mustafa and Hashim 2022). Therefore, this training workshop on effective teaching methods is an opportunity to elevate the lecturers' knowledge, skills, and attitude that are useful within the context of their work (Stoloff et al. 2015)

The improvement in the lecturers' knowledge suggests that their cognitive learning outcomes increased after they completed the effective teaching methods workshop (Alsalamah and Callinan 2021). Before the training workshop, the lecturers scored moderately high to high scores for their knowledge of how to prepare and design teaching plans, motivate students, and make subjects interesting. It was noticed that the workshop greatly enhanced their knowledge on how to design classrooms and other activities, show concern and respect for the student and student learning, practice better classroom management and control, as well as design assessments, and provide feedback. This finding suggests that besides introducing the lecturers to the various teaching methods they can use to solve pedagogical challenges, it is also vital to train the lecturers to understand their students and their teaching goals, standards, and objectives.

The lecturers' skills showed the most notable improvement in the evaluation learning after the intervention training workshop on effective teaching methods. This finding implies that the lecturers' acquisition of technical applications was successfully addressed because they were able to perform well in the desired task (Alsalamah and Callinan 2021; Kirkpatrick and Kirkpatrick 2016). Before the workshop, the lecturers were confident of their skills in making subjects interesting, motivating students, and preparing and designing teaching plans. Their confidence in their skills was enhanced even further after the workshop. They reported that they could design classrooms and other activities, practice better classroom management and control, and motivate students better using the contents they learnt during the workshop. Thus, the lecturers must be given the opportunities to discuss different teaching methods they learnt during the workshop and present possible solutions to overcome obstacles based on the skills they learnt during the workshop.

The lecturers' attitude towards effective teaching methods also improved following the training workshop. This improvement means the lecturers perceived that it was worthwhile to apply what they learnt from the training workshop on effective teaching methods (Kirkpatrick and Kirkpatrick 2016). Improvement in lecturers' attitudes also implies that their opinions and areas of concern were addressed during the workshop. Before the workshop, the lecturers were most keen on motivating students, making subjects interesting, and practising classroom management and control. After they attended the two-day workshop, the lecturers were likely to perform the tasks that involved effective teaching. They were more likely to prepare and design better teaching plans and design better classrooms and other activities.

IMPLICATIONS

This study provides a substantial contribution to the existing literature by affirming the efficacy of the Kirkpatrick model in evaluating educational training, extending its application TVET in Malaysian higher education. This adds depth to the model's utility, which has predominantly been explored in corporate settings. Our findings corroborate previous work by Heydari et al. (2019), emphasizing the central role of knowledge, skills, and attitudes in effective teaching. This provides a strong empirical basis for future research endeavors in teaching effectiveness within TVET and broader academic contexts. Moreover, our study aligns with research by Khan and Haseeb (2017) and Mustafa and Hashim (2022), highlighting the motivational benefits of educational training programs. These theoretical implications suggest avenues for future research, including the exploration of motivational theories in TVET faculty development.

From a practical perspective, this research highlights the importance of comprehensive needs assessments in the formulation of effective training programs, a concept highly relevant TVET and general higher education contexts. Findings from this study inform policymakers, and university or college administrators on the effective and measurable effects of ongoing professional development for educators. Evidence from this study suggests that well-designed training programs can lead to measurable improvements in teaching effectiveness. For instance, a yearly training program could be mandated to ensure teachers are up-to-date with the latest pedagogical techniques. The notable positive transformation in educators' attitudes following the training program is especially significant. It suggests that professional development can stimulate not just competency but also a motivational shift, essential for perpetuating a culture of consistent educational refinement across teaching contexts, notably in TVET. The employment of pre-test and post-test measurements in this study advocates for their broader application as standard, reliable evaluative metrics. These can be integrated into quality assurance protocols across diverse educational platforms, thereby enriching the domain of academic faculty development. Thus, by integrating these multifaceted practical implications, educational stakeholders can more effectively meet the demands of educator training, particularly in the dynamic fields of higher education and TVET.

CONCLUSION

In conclusion, this study has rigorously evaluated the impact of a targeted training workshop on lecturers' knowledge, skills, and attitudes within a higher education setting in Malaysia. Utilizing the Kirkpatrick model as a theoretical framework, the investigation has extended the existing literature by focusing not only on pedagogical efficacy but also on the intrinsic motivations that drive teaching quality. The empirical data gathered through pre-test and post-test evaluations demonstrate unequivocal improvement across all measured components—knowledge, skills, and attitude—among the participating lecturers. This study serves as a reference for academic administrators, particularly in TVET and similar institutions, offering a tested framework for professional development programs. The findings have implications for ongoing staff training and quality assurance, highlighting the role of pre-test and post-test evaluations as a reliable assessment tool.

Despite its contributions, the study acknowledges specific limitations that offer fertile ground for future investigations. First, the sample size was relatively small, consisting of 21 participants, which may limit the generalizability of the findings. Future work should consider a more extensive sample to bolster the robustness of the results. Moreover, the study's geographical focus on Malaysia also suggests that caution should be exercised in generalizing the findings to different cultural or institutional contexts. Future research could undertake a comparative analysis involving multiple nations or educational settings to address this limitation. Another aspect to consider is the heterogeneity of the lecturers in terms of their highest academic qualifications and teaching experience, which might influence the training's effectiveness. Subsequent studies could categorize lecturers according to these variables to provide a more nuanced understanding. Similarly, the current study did not have the scope to engage all levels of the Kirkpatrick model due to time and resource constraints. Future research should strive to incorporate a comprehensive evaluation approach that includes both internal and external factors for a more in-depth understanding of training impact. The time-restricted format of the workshop allowed only group presentations, limiting individual contributions. Future training programs could be designed to enable all participants to present, fostering a more interactive and participatory environment. Given the limitations in our study concerning the time-bound evaluation, we also echo the sentiment that long-term assessment of training effectiveness warrants attention in future studies.

In sum, while this study delivers key insights into the pedagogical and attitudinal shifts that can be achieved through targeted training programs, it also highlights the need for a continued, multi-dimensional approach to educational research. Through such efforts, we can hope to create a sustainable and adaptive educational environment that meets the complexities of 21st-century academia.

DECLARATION OF CONFLICTING INTERESTS

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Data availability statement

Data will be made available on a reasonable request.

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