

Evaluating the Impact of ACE Modules on Innovative Teaching and Learning Approaches in Entrepreneurship Education

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Abstract

To boost graduate employability and provide students with entrepreneurial competencies, entrepreneurship education has grown in importance in higher education institutions. It is commonly acknowledged that including entrepreneurship education into the curriculum of higher education institutions is crucial for developing students' entrepreneurial skills and boosting graduates' employability. The effectiveness of the ACE modules in enhancing learning outcomes, entrepreneurial activity engagement, and entrepreneurial competences is examined in this study. The ACE Modules are part of the ACE programme, with online surveys sent to participants from 2023 to 2025. In addition to these surveys, informal interviews and observations were conducted to gain a richer understanding of the participants' experiences and the general perception of the modules. Most students were positive toward the ACE modules. The findings indicate that students responded favourably to the ACE modules, with mean scores exceeding 4.0 across all evaluated items. Moreover, the participants of the ACE modules indicated that their overall learning experiences and entrepreneurial readiness were enhanced by the innovative practices incorporated within the modules. The findings further provide valuable insights for educators and policymakers seeking to enhance entrepreneurship education initiatives in universities.

Keywords: Entrepreneurship Education, Teaching And Learning Innovation, Module Development, Higher Education, Accelerated Entrepreneurship Development Programme (ACE)

Introduction

Nowadays, as structural employment challenges become more obvious, entrepreneurship education (EE) has increasingly been emphasised as a tool for nurturing entrepreneurs. It is hoped that this will lead to the creation of employment opportunities, thereby stimulating economic growth (Li et al., 2025). Many universities have incorporated entrepreneurial education into their courses to solve this problem. It is crucial to realize that the goals of the

entrepreneurship modules typically cover topics like developing critical entrepreneurial skills, helping local entrepreneurs, promoting new ventures and job creation, and cultivating entrepreneurial attitudes and culture. Entrepreneurship education is a tactic used in Malaysia to become a high-income country (Yusoff & Marsim, 2018). Hence, to lower unemployment, boost the number of entrepreneurs, and enhance graduates' employability skills, the Malaysian government has actively encouraged entrepreneurship education (Shamsudin et al., 2016). Although several entrepreneurship programmes have been implemented with the aim of improving and developing students' skills as part of their post-study plans, the effects have yet to be assessed (Ismail et al., 2019). Therefore, further studies are needed to determine the impact of entrepreneurship programmes on improving and developing students' skills.

The ACE Modules (Entrepreneurship Modules for Mentor and Participants)

Entrepreneurship education has gained significance in numerous universities in Malaysia (Wahidmurni et al., 2020). Nevertheless, it was discovered that many students preferred pursuing high-paid jobs rather than becoming entrepreneurs or starting their own businesses (Ahmad and Buchanan, 2015). This preference persists even though students have attended many entrepreneurship classes and programmes. This issue appears to happen because the instructions are generally conducted in a passive manner and lack interactivity. A study conducted by Chen et al. (2015) in Taiwanese universities found that, although students reported a high level of satisfaction and success in learning, their entrepreneurial intention did not improve or increase, despite undergoing the learning process. This could be attributed to the fact that the curriculum introduced by the universities was unable to persuade them effectively or meet their demands (Wahidmurni et al., 2020).

Given these challenges, instructional innovations should be considered, and one related innovation is the development of a module that functions as instructional material. Chen et al. (2015) suggested that future research should design an entrepreneurship module that integrates both entrepreneurship and relevant knowledge to achieve an improved effect. A module is preferred because it is self-instructional, self-contained, stand-alone, adaptive, and user-friendly. Such characteristics are advantageous for fostering students' learning independence and are aligned with the spirit of independence, self-confidence, and a task-and result-oriented approach necessary in entrepreneurship (Wahidmurni et al., 2020). In addition, this type of learning, termed "independent learning", is characterised by its support for students' active engagement in learning. This is also implied by Koesworo et al. (2007), who emphasised that one's ability to work in an independent, knowledge-guided way is positively correlated with their motivation to engage in entrepreneurship.

Therefore, to produce holistic and competitive graduates, an entrepreneurship incubator was established. This initiative provides a platform for students to operate real businesses within the campus environment, transforming classroom theory into practical experience. More than just a business space, the incubator represents an innovative approach to experiential learning. In response to this need, the ACE modules were planned and developed, and this is part of incubator initiative. The modules were developed and designed to guide the participants (the students) and instructors thoroughly from idea generation, business planning, business implementation and evaluation of performance. The modules were also aimed to integrate knowledge from several fields such as management, marketing,

operations and finance (Majid & Ramli, 2025). Thus, by combining theoretical instruction with practical experience, the modules aim to bridge the gap between classroom learning and real-world entrepreneurship. Therefore, this study aims to examine the effectiveness of the ACE modules in enhancing participants' entrepreneurial skills and learning experience. Particularly, the study aims to evaluate participants' perceptions of the module and to assess its impact on their entrepreneurial readiness and overall learning outcomes.

Literature Review

This section discusses the teaching and learning innovation, the modules for entrepreneurship, the research objectives, the concept and structure of ACE modules, and the overview of Accelerated Entrepreneurship Development Programme (ACE) Modules.

Teaching and Learning Innovation

Entrepreneurship education can be defined as training aimed at managing and creating new, small, or even growing business entities. This training is incorporated within the educational and training system at all levels (Xavier et al., 2012).

Innovation can be implied as trying new approaches or making certain changes driven by adaptability and creativity. In the context of education, innovation is not limited to a sole definition or formula; rather, it is associated with the way we think or reflects the mindset of willingness to challenge the status quo. It encourages the exploration of methods to engage learners, deliver content, and measure success (Thompson, 2024).

Module for Entrepreneurship

It has been suggested that this series of entrepreneurship programmes was designed to develop students' skills in strategizing steps for their plans following graduation; however, the actual impact of these programmes has yet to be thoroughly evaluated (Ismail et al., 2019). The entrepreneurship module is expected to encourage students to explore the real world of work. Through this module, students are prompted to enhance their employability by developing an entrepreneurial mindset and gaining exposure to practical career-related skills.

According to research by Li et al. (2025), entrepreneurship courses can motivate students to pursue more job opportunities. According to the study, these modules assist students make well-informed judgments about employment options by giving them employer insights, giving them access to tools they didn't have before to increase their employability, and allowing them to create a unique employability narrative. The researchers advise reevaluating and looking into the wider benefits of entrepreneurship education considering these findings.

The module is a structured learning resource that is an important part of the teaching and learning process. A module usually has learning materials, teaching methods, rules, and evaluation parts that are all put together in a way that keeps students interested and helps them learn (Alagappan et al., 2021). Integrated learning design lets educators help students build skills through structured experiences. When modules like the ACE are linked to real-world situations, they can turn ideas into skills and help students learn more deeply.

The research objectives of this study are as follows:

To examine participants' perceptions of the effectiveness of the ACE modules in developing entrepreneurial skills.

To determine the overall impact of the ACE modules on participants' learning experiences.

The ACE Module: Concept and Structure

In order to introduce students to entrepreneurship, the ACE Modules were created as a strategic educational project. The module, which was formally created in November 2020, consists of two essential resources: a simulation book and a facilitator guidebook. The ACE module is intended to assist students by providing structured exposure to entrepreneurship techniques and early-stage advice (Modul ACE, 2021).

The Overview of Accelerated Entrepreneurship Development Programme (ACE) Modules

The authors' (ACE Modules' writers) dedication to create students who are not only knowledgeable but also able to succeed in business settings is shown by the creation of the ACE modules. These modules are in line with the ACE objectives (Majid & Ramli, 2026) and the objectives of several national programs, such as the National Entrepreneurship Policy 2030 (DKN 2030) and the Entrepreneurship Action Plan for Higher Learning Institutions (PTK IPT 2021–2025). These plans stress the need to create entrepreneurial ecosystems that are both open to everyone and competitive. The ACE modules not only help students grow, but they also want to make the academic community stronger by getting more staff involved in scholarly writing and increasing the number of entrepreneurship-related publications the university produces (Majid et al., 2025).

Contents of Accelerated Entrepreneurship Development Programme (ACE) Modules

The ACE modules are entrepreneurship modules developed to equip future entrepreneurs with essential knowledge and skills across various business disciplines. The content of the module is structured into eight core topics, each focusing on aspects of business development (ACE Module, 2021). The first topic focuses on entrepreneurial identity and ethics, aiming to establish a moral and personal foundation for aspiring future entrepreneurs. This is followed by the second topic, which focuses on business planning and guides students in developing viable startup ideas. Meanwhile, the third and fourth topics address operational aspects of business management, including organisational structure, human resource management, and operations management.

Topic 5 centres on marketing strategies, while Topic 6 explores financial management, enabling students to understand budgeting, accounting, and investment fundamentals. Topic 7 emphasises the development of soft skills, particularly negotiation and business communication, which are essential for effective stakeholder engagement. The final section, Topic 8, provides entrepreneurial insights and motivational quotes drawn from real-life experiences to inspire and motivate learners.

In addition, the guidebook features a list of contributing authors and references, reflecting its academic credibility and collaborative development. Overall, the ACE modules serve as a holistic entrepreneurship training resource, aligning with university's mission to cultivate capable, ethical, and innovative entrepreneurs (ACE Module, 2021).

How the ACE Module Relate to Teaching and Learning Innovation

There are several key principles related to teaching and learning innovation, such as outcome-based education, experiential learning, interdisciplinary content with real-world relevance, the development of 21st century skills, student-centred and reflective learning, as well as modular and scalable curriculum design.

Methodology

This section discusses the data collection process and questionnaire.

Questionnaire

Two versions of the questionnaire were created. While the second version concentrated on gathering feedback about participants' experiences with the ACE Modules after their participation, the first version sought to record participants' expectations prior to interacting with the ACE Modules (pre-session). The study was able to evaluate variations between pre-session expectations and post-session perceptions because to this structure. Accordingly, to guarantee accessibility and clarity for every respondent, the questionnaire was also distributed bilingually in Bahasa Melayu and English.

Data Collection

Google Forms was used to give online questionnaires to participants in the ACE program between 2023 and 2025. The pre-session survey was completed by 15 respondents, while the post-session data collection involved 34 respondents. Simple observations were made to look at day-to-day activities and interactions between participants to further enhance the data. To gain a greater understanding of the participants' experiences and opinions of the program, informal interviews were also carried out.

Sample size

The sample size for this study was relatively small, as the questionnaire could only be completed by participants who had enrolled in and utilised the ACE modules. As cited by Memom et al. (2020), Roscoe (1975) suggested that a sample size between 30 and 500 is appropriate for most behavioural studies, indicating that the current sample falls within an acceptable range. Nevertheless, future studies are encouraged to include a larger sample size to strengthen the robustness and generalisability of the findings.

Expectations of the participants before experiencing the ACE module (pre-session)

There are eleven (11) questions regarding the expectations of the participants before experiencing the ACE module.

Table 4.0

Expectations of the Participants Before Experiencing the ACE Module (Pre Session)

Item	Mean
To what extent do you expect "The ACE" module to improve your understanding of entrepreneurship?	3.31
How practical and applicable do you expect the content of "The ACE" module to be for your business or business idea?	3.23
Do you expect the module to help you develop or refine your business plan?	3.31
Do you expect "The ACE" module to improve your confidence in starting or running a business?	3.46
How well do you expect the module to help you develop entrepreneurial skills such as leadership, creativity, risk-taking, and problem-solving?	3.46
Do you expect the module to provide useful tools or frameworks for entrepreneurship (e.g., Business Model Canvas, Lean Startup)?	7 answered yes and 8 answered not sure.
Do you expect to feel more prepared to launch or grow your business after completing the module?	3.69
Do you expect to be encouraged to reflect on your learning and entrepreneurial journey throughout the module?	3.46
Which specific teaching innovation(s) in The ACE module do you expect will have the most positive impact on your learning?	3.46
Do you expect innovative teaching approaches to be used throughout the incubator programme (The Port) and The ACE module?	3.31
Do you expect the teaching in the ACE module and incubator (The Port) to be more innovative compared to other academic courses?	3.62

Participants expressed moderate expectations that the ACE Modules would enhance entrepreneurial skills, build confidence, foster teaching innovation, and support skills development, with average ratings ranging from 3.23 to 3.69. They also anticipated that the specific teaching innovations included in the modules would have a positive impact on their learning. Additionally, participants expected the teaching approach to be more innovative compared to other academic courses.

Demographic of the Respondents

The demographic data of the 34 respondents who participated in the study is presented in Table 4.2. In terms of age distribution, the most frequently reported age is 20 years (n = 8 respondents, 23.5%). The next most common age is 21 years (n = 7 respondents). Smaller groups included those aged 24 years (6 respondents), 19 years (5 respondents), 23 years (3 respondents), and those aged 25 years and older (3 respondents). Only 2 respondents

reported being 22 years old. All respondents were enrolled in the undergraduate programmes (diploma and bachelor's degree), comprising 34 respondents.

Regarding the year of commencement of the programme, 13 respondents (38.2%) indicated 2024 as the most common start year, with an equal number of respondents in 2025 (13 respondents, 38.2%). Eight respondents began in 2023. The smaller number of participants in 2023 may be attributed to the programme having just been launched, resulting in less awareness of the programme compared to 2024 and 2025.

Table 4.2

Demographic of Respondents

Category	Group	Frequency (n)	Percentage (%)
Age	19	5	14.7
	20	8	23.5
	21	7	20.6
	22	2	5.9
	23	3	8.8
	24	6	17.6
	25 and above	3	8.8
Programme	Undergraduate (Diploma and Bachelor's)	34	100%
	Postgraduate	0	0
Subjects Taken	MGT162 – Fundamentals of Management	15	44.1
	ENT300 – Fundamentals of Entrepreneurship	20	58.8
	ENT530 – Principles of Entrepreneurship	5	14.7
	MGT400 – Introduction to Management	4	11.8
Year Joined	2023	8	23.5
	2024	13	38.2
	2025	13	38.2

Feedback on The ACE Modules

An overview of participant comments regarding the ACE Modules is shown in Table 4.3. With all mean scores above 4.1, the results show a high degree of satisfaction with the module. The item that assessed how well the module helped students develop entrepreneurial abilities like leadership, creativity, risk-taking, and problem-solving had the highest mean score (M = 4.3). This shows that the ACE Module was successful in helping the participants develop critical entrepreneurship skills.

The second and third items both recorded a mean score of 4.2, indicating that students generally felt more prepared to launch or grow their businesses after completing the programme. They were also encouraged to reflect on their learning and entrepreneurial journey throughout the module. These findings highlight the module's role in promoting both practical readiness and reflective learning among students.

Additionally, the mean scores for the teaching innovation-related items were 4.1. Students concurred that the ACE Module's unique teaching strategies improved their learning and that these strategies were regularly used throughout the program. Additionally, compared to other academic courses, respondents thought the ACE Module's teaching strategies were more innovative.

Overall, the results suggest that the ACE Module successfully integrates innovative teaching strategies with entrepreneurial skill development, contributing to positive learning experiences among the participants.

Table 4.3

Feedback on The ACE Module

No.	Item	Mean
1.	How well did the module help you in developing entrepreneurial skills such as leadership, creativity, risk-taking, and problem-solving?	4.3
2.	Do you feel more prepared to launch or grow your business after completing the programme?	4.2
3.	Were you encouraged to reflect on your learning and entrepreneurial journey throughout the module?	4.2
4.	The teaching innovation(s) in the ACE module had impacted your learning.	4.1
5.	Innovative teaching approaches were used throughout the ACE module.	4.1
6.	The teaching in the ACE module was innovative compared to other academic courses.	4.1

Recommendations and Conclusion

This section provides recommendations for the further improvement of the ACE modules and highlights the main conclusions drawn from the research.

Recommendations for Improvement of the ACE Modules

The ACE module was positively received by the participants however, this study has identified several key areas for improvement aimed at further enhancing the effectiveness and sustainability of the module.

Entrepreneurs and Industry Practitioners

It is important to hold discussions about entrepreneurship to gain a deeper and more complete understanding of the area. Through this program, students can learn directly from guest speakers who have experience and skills as entrepreneurs.

Also, entrepreneurs or industry experts can help students understand the ideas and real-world applications covered in the module much better by sharing their knowledge and experiences. During these chat sessions, students can ask questions, share ideas, and learn more about the module material on this interactive platform. So, planning an entrepreneurship talk program can make the module delivery more effective and encourage students to start their own businesses and get involved in business activities.

Suggestions from participants indicate that the module could involve more guest speakers, entrepreneurs, and industry experts who can share real experiences and practical knowledge with students. This is in line with the suggestions from participants: *“Organising an entrepreneurship talk program to explain this module more clearly and effectively”* (*“Menyediakan program ceramah keusahawanan untuk menerangkan modul ini dengan lebih baik dan berkesan”*).

Integrate Cross-Disciplinary Participation

Future studies should ask respondents about the type of bachelor's degree or diploma program they are pursuing; this is to better understand participants' competencies and entrepreneurship knowledge. Future research should consider the potential impact of academic background differences on students' readiness, learning results, and involvement in entrepreneurial programs. In addition, students from various academic areas or faculties could participate in the module to further improve the learning impact. This strategy can promote cooperation and a variety of viewpoints, which can result in more creative company concepts.

The programme and exposure offered by the module should be targeted at students from various academic programmes. As highlighted by Li et al. (2025), entrepreneur education (EE) remains largely exclusively accessible to a specific group, rather than being widely available; over half of the entrepreneurship programmes and modules are specifically directed at business students, as well as owners and managers of small businesses.

The general rationale for favouring business students is that they are perceived as more likely to pursue entrepreneurship in the future, particularly given the limited resources available for EE (Li et.al, 2025). However, exclusively targeting business students for EE may be overly narrow and problematic. On one hand, even among business students who receive EE, most will ultimately become employees rather than entrepreneurs. On the other hand, statistics indicate that graduates from non-business disciplines, such as science, technology, engineering, mathematics, and medicine (STEMM), as well as those from the arts, are often just as likely as their counterparts in business majors to become entrepreneurs, particularly through self-employment (Li et.al, 2025).

Offer the Programme to Postgraduate Students

As the participants for this study were primarily undergraduate students, it is recommended to extend the programme to include postgraduate students. Involving postgraduate participants would allow the programme to benefit from a broader range of academic backgrounds, experiences, and levels of maturity. Postgraduate students offer different insights and perspectives based on their advanced studies, research exposure, and professional experiences. Consequently, their participation could enrich discussions, enhance collaborative learning, and provide more diverse feedback for improving the programme. This broader participation would facilitate the evaluation of the programme from multiple perspectives, ultimately leading to more comprehensive and meaningful improvements in the future.

Conduct Regular Module Evaluation

To determine the module's efficacy, regular evaluation and feedback should be carried out at least twice a year. To maintain the module's relevance and impact, surveys, interviews, and reflection sessions can be used to identify the module's strengths and areas for development. This is consistent with research by Hijaz et al. (2025) that highlighted the significance of prompt feedback and organized assistance for students to participate in learning activities in a meaningful way.

Focus Group or Interviews

When it comes to planning future studies based on this module development, incorporating some qualitative methods, such as focus groups or interviews, may complement the quantifiable findings of this study. While the quantitative methods allow researchers to measure the module and its worth, as well as identify the trends and relationships, qualitative methods give attention to the teaching/learning process. Qualitative feedback may shed light on some of the aspects of the process that the structured surveys cannot fully capture, such as the students' motivations, the challenges they encounter while learning, and the suggestions they offer for the better delivery of the module. These insights are important to the continuous development of the modules, so that they remain relevant, flexible and effective in fostering entrepreneurial education.

This suggestion agrees with the view of Gundumogula (2020), who stated that focus group discussions are an effective addition to other methods of collecting data. The author explains that focus groups are useful in collecting data from participants in a short time, while also fostering active discussion among the participants. This engagement often produces richer and more important findings. Thus, the integration of qualitative approaches and quantitative methods will enhance the research and improve the understanding of the teaching effectiveness of the entrepreneurial educational initiatives, such as the ACE modules.

Conclusion

This study contributes to the developing body of literature on entrepreneurship education by illustrating the impact of experiential learning on the effectiveness of entrepreneurship education in higher education institutions. The findings underscore the significance of the ACE module as a novel educational approach integrating theory and practice of entrepreneurial engagement. The participants' favourable comments reinforce the positive impact of the module's instructional design and support the notion that experiential and practice-based learning settings are valuable for fostering entrepreneurial competencies.

The ACE module includes several interactive components, such as opportunities for reflective learning, peer-to-peer collaboration and feedback, the use of useful tools like the Business Model Canvas, and practical business simulations. Together, these elements encourage active participation and give students the opportunity to convert academic knowledge into useful entrepreneurial insights. The program offers a more dynamic and applicable learning experience than conventional lecture-based or theory-oriented teaching techniques, better preparing students for real-world entrepreneurial issues.

Higher education institutions should consider incorporating experiential entrepreneurship modules like ACE into their curricula, as this study shows promising results. In an increasingly competitive economic world, such programs may improve students' practical skills, entrepreneurial mindset, and preparedness to engage in entrepreneurial activity.

Contribution to the Field of Study

This study contributes to the field of entrepreneurship education by providing empirical evidence on the effectiveness of an incubator-based, experiential entrepreneurship education model within a higher education context. The uniqueness of this research lies in its evaluation of a structured and interdisciplinary module that integrates theoretical knowledge

with real-world business application, supported by both pre- and post-participation insights. By demonstrating how such an approach enhances entrepreneurial competencies, learning experiences, and graduate readiness, this study extends current understanding of innovation in teaching and learning. It also offers practical implications for educators and policymakers seeking to design more impactful entrepreneurship education frameworks that align with contemporary economic and workforce demands.

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