The Effectiveness of e-Learning Micro-Credentials in Enhancing Agriculture Business Pitching Skills Among Agro-Entrepreneurial Students

Jacqueline Joseph[1]

[1]Faculty of Plantation and Agrotechnology, Universiti Teknologi MARA UiTM Sabah Branch Kota Kinabalu Campus, Locked Bag 71, 88997 Kota Kinabalu, Sabah, Malaysia

***Corresponding Authors**

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ABSTRACT

Effective business pitching is a vital skill for agro entrepreneurs, yet many students lack the confidence, structure, and persuasive delivery needed to secure support for their ventures. This study investigates the effectiveness of e-learning micro-credential in strengthening agricultural business pitching skills among Diploma in Agropreneurship students at UiTM Sabah. Using a pre-experimental one-group pre-test–post-test design, 33 students were first exposed to a Massive Open Online Course (MOOC). AGB283 Agriculture Business Pitching and later enrolled in a targeted micro-credential module, UMC579: Crafting Agri-Startup Business Plan. Data were collected through structured questionnaires and analysed using paired t-tests. Results revealed significant improvements in pitching performance, engagement, and perceived learning relevance, with post-micro-credential outcomes far surpassing those of the MOOC stage ($t(32) = 13.36$, $p < .001$). Students reported improvements in pitch structuring, confidence, and clarity, which were further enhanced using interactive digital tools, including AI-driven pitching coaches and gamified assessments. The findings highlight micro-credentials as a transformative pedagogical innovation that aligns with 21st-century education emphasising learner-centered design, digital engagement, and competency-based outcomes. This approach not only fosters entrepreneurial competencies but also ensures higher completion, satisfaction, and pitching skill mastery compared to traditional MOOCs. Future research should explore long-term retention, scalability across sectors, and integration of emerging technologies to further strengthen their impact on agro-entrepreneurship education.

Keywords: Agro-entrepreneurship, business pitching, e-learning, micro-credential

INTRODUCTION

Agriculture remains a cornerstone of Malaysia's economic resilience and food security, particularly in Sabah where the Sabah Maju Jaya (SMJ) Development Plan 2021–2025 identifies agriculture, agro-based industry, and resource sustainability as key economic thrusts. The plan highlights the urgent need to modernise agriculture, empower agropreneurs, and build sustainable value chains that uplift rural communities while contributing to state and national development.

In this context, agropreneurial students must go beyond traditional farming practices to strategically design and implement viable business models, attract investment, and communicate compelling value propositions to diverse stakeholders (Polcz, 2021). Among the most critical yet underdeveloped competencies are the ability to pitch agricultural business ideas effectively, a skill that requires a blend of market awareness, persuasive communication, and entrepreneurial confidence (Sabaj et al., 2020).

As the economy becomes increasingly knowledge- and innovation-driven, higher education institutions are exploring flexible, digital, and competency-based learning to prepare graduates for these demands. Massive Open Online Courses (MOOCs) have expanded access to agricultural and entrepreneurial education (Zhang et al., 2023;

Devakumar 2014), but their broad and often generalised content has raised concerns about learner engagement, completion rates, and contextual skill transfer. Most MOOCs emphasise content delivery and conceptual knowledge, with minimal focus on spoken delivery skills essential for investor pitches or stakeholder engagement (Resei et al., 2018). While MOOCs pioneered technology-mediated learning, the emergence of MCs has provided a more targeted and credentialed pathway. In agricultural education, this evolution is particularly relevant, as MCs can bridge technical knowledge with entrepreneurial skills such as business pitching, thereby preparing agro-entrepreneurial students for real-world challenges. In response, micro-credentials (MCs) have emerged as a transformative alternative. These modular, stackable, and verifiable certifications emphasise targeted skill mastery, industry recognition, and employability outcomes, aligning education with the realities of the future workforce (Gamage & Dehideniya, 2025; Abdul Halim et al., 2024; Alezi et al., 2024).

Within this landscape, the development of the present MC, UMC579: Crafting Agri-Startup Business Plan, under UiTM Cawangan Sabah (UiTMCSH) responds directly to UiTM's institutional performance indicator (PI014): the number of new micro-credential modules offered, thereby contributing to the university's strategic targets while strengthening teaching innovation in agropreneurship education. UiTMCSH, as the Lead Program Manager or *Pengurus Utama* of the Diploma in Agropreneurship (AT113), has identified Agricultural Business Pitching (AGB283) as a critical course for curriculum innovation, given its direct relevance to strengthening students' entrepreneurial communication skills.

In line with the Malaysian Qualifications Framework (MQF) 2.0 (2024), this MC has been revised to align with Programme Learning Outcome (PLO) 5, which emphasizes the ability to communicate agro-based ideas effectively with respect, tolerance, and ethical responsibility. By embedding Education for Sustainable Development (ESD) and Value-Based Education (VBE) principles, the MC ensures that students are not only trained to pitch viable business models but also to balance profitability with environmental stewardship, social inclusivity, and long-term sustainability.

This initiative also aligns with UiTM's aspiration to become a Globally Renowned University (GRU2025). UiTM Sabah Branch (UiTMCSH) has pledged its commitment to the Amanat Rektor 2024, delivered by the 13th Rector, YBrs. Associate Professor Dr. Rozita @ Uji Mohamed, which aspires to position UiTMCSH as an Enterprising Campus by 2025. This aspiration is framed through the Quintuple Helix 5R Framework, integrating five strategic thrusts to build responsible, resilient, relevant, research-driven, and relationship-based innovation ecosystems that nurture entrepreneurial, innovative, and industry-ready graduates (Kholiavko et al., 2023).

In light of this development, this study investigates the effectiveness of e-learning micro-credentials in enhancing agricultural business pitching skills among agro-entrepreneurial students. By comparing outcomes between a control group exposed to a MOOC and an experimental group completing a micro-credential module, the research seeks to provide evidence on how micro-credentials can strengthen curriculum delivery, align with MQF 2.0 learning outcomes, and strategically support UiTMCSH's transformation into an enterprising, innovative, and industry-ready institution by 2025

Aims of Study

i. To evaluate the effectiveness of e-learning micro-credential module compared to M in enhancing agro-entrepreneurial students' business pitching skills.
ii. To examine student engagement, completion rates, satisfaction, and perceived relevance of learning in MOOCs and micro-credential modules.

Research Questions

i. Do micro-credential modules significantly enhance agro-entrepreneurial students' business pitching skills compared to MOOCs?
ii. Are there significant differences between micro-credentials and MOOCs in student engagement, skill mastery, and perceived relevance of learning?

Hypotheses

H_1: Agro-entrepreneurial students completing micro-credential module will demonstrate significantly higher business pitching skills, engagement, skill mastery, and perceived relevance of learning compared to those completing MOOCs.

H_0: There is no significant difference between micro-credential and MOOC in enhancing agro-entrepreneurial students' business pitching skills, engagement, skill mastery, or perceived relevance of learning.

METHODOLOGY

Experimental and Sampling Design

This study employed a pre-experimental one-group pre-test–post-test design involving 33 fourth-semester students from the Diploma in Agropreneurship (AT113) programme, enrolled in the Agricultural Business Pitching (AGB283) course. Using purposive sampling, the same group of students was exposed to two modes of instruction on the U-Future platform: first through the MOOC titled "*AGB283 Agricultural Business Pitching*" (https://ufuture.uitm.edu.my/mooc/course_detail.php?course=AGB283, followed by the micro-credential titled "*UMC579 Crafting Agri-Startup Business Plan*" (https://ufuture.uitm.edu.my/micro-credential/course_detail.php?course=UMC579). Both MOOC and MC were developed by the author to provide a structured and progressive learning pathway, where the MOOC emphasised theoretical foundations and essential concepts of agricultural business pitching, while the MC offered a more practical, skills-oriented experience that required students to create and pitch their own business plans. Students' business pitching skills, engagement, and perceived relevance of learning were measured before and after the interventions through Likert-scale self-assessment.

Data Analysis

Inferential analyses were conducted using paired sample *t*-tests with IBM SPSS Statistics (Version 29.0.2.0) to compare differences in business pitching skills, engagement, and perceived relevance of learning before and after the interventions. Descriptive analyses were employed to summarise student completion rates, satisfaction levels, performance categories, and learning preferences.

MOOC Delivery (Blended Learning)

Students completed the MOOC syllabus across 14 weeks, integrated into the semester's blended learning structure. Weekly learning activities included online lecture materials, discussion forums, and classroom-based guidance. The blended mode ensured that students applied MOOC content progressively with lecturer facilitation (Table 1).

Micro-credential Delivery (Online, Self-paced Learning)

Students engaged in the micro-credential modules through self-paced online learning, scheduled for 4 hours per week over 2 months (total 32 hours). The module was designed with structured video lectures, interactive assessments, and competency-based tasks aligned with the course learning outcomes (Table 2).

Table 1. Syllabus contents of the MOOC AGB283 Agricultural Business Pitching

Chapter	Title	Sub-Topic
1	Introduction to Agricultural Business	1.1 Definition of Entrepreneurship, Entrepreneur and Enterprise 1.2 Types of Entrepreneurs in Agriculture Sector 1.3 Role of Entrepreneur for economic development
2	Creativity and Innovation	2.1 Sources of New Idea and Creativity 2.2 Creating Idea and Recognizing New Opportunities 2.3 Sources of Innovation 2.4 Types of Innovation 2.5 Reason Towards Innovation

3	How to Start a Small Business	3.1 Identification of Business Opportunity 3.2 Scanning the Environment for Opportunities 3.3 Evaluation of Alternative 3.4 Procedure to Start a New Venture 3.5 Issues Business Plan Preparation
4	Preparation of Business Plan	4.1 Business Models Canvas
5	The Business Plan Pitch	5.1 Identification of Targeted Audience 5.2 Preparation of Pitching 5.3 Flow of Pitch
6	Institutional Support to Small Scale Industries in Malaysia	6.1 Government Support System 6.2 Non-Government Support System 6.3 Financial Institution

Table 2. Syllabus contents of the MC: UMC579 Crafting Agri-Startup Business Plan

Chapter	Title	Module
1	Business Idea and Market	**Module 1**: Overview of Agribusiness Ventures. **Module 2**: Ideation and Creativity in Business Innovation. **Module 3**: Market Research and Customer Profiling. **Module 4**: Value Proposition and Value Fit.
2	Crafting Business Plan	**Module 5**: Market Research and Analysis **Module 6**: Financial Planning and Management **Module 7**: Operational Strategy Development **Module 8**: Marketing and Sales Strategies
3	Delivering a Business Plan	**Module 9**: Effective Business Communication **Module 10**: Presentation Skills and Techniques **Module 11**: Pitching to Investors and Stakeholders **Module 12**: Feedback Integration and Plan Refinement
4	Sustainability and Circular Economy in Business	**Module 13**: Principles of Sustainability in Business **Module 14**: Circular Economy Concepts **Module 15**: Measuring Impact and Sustainable Value **Module 16**: Ethical Decision-Making and Responsible Leadership

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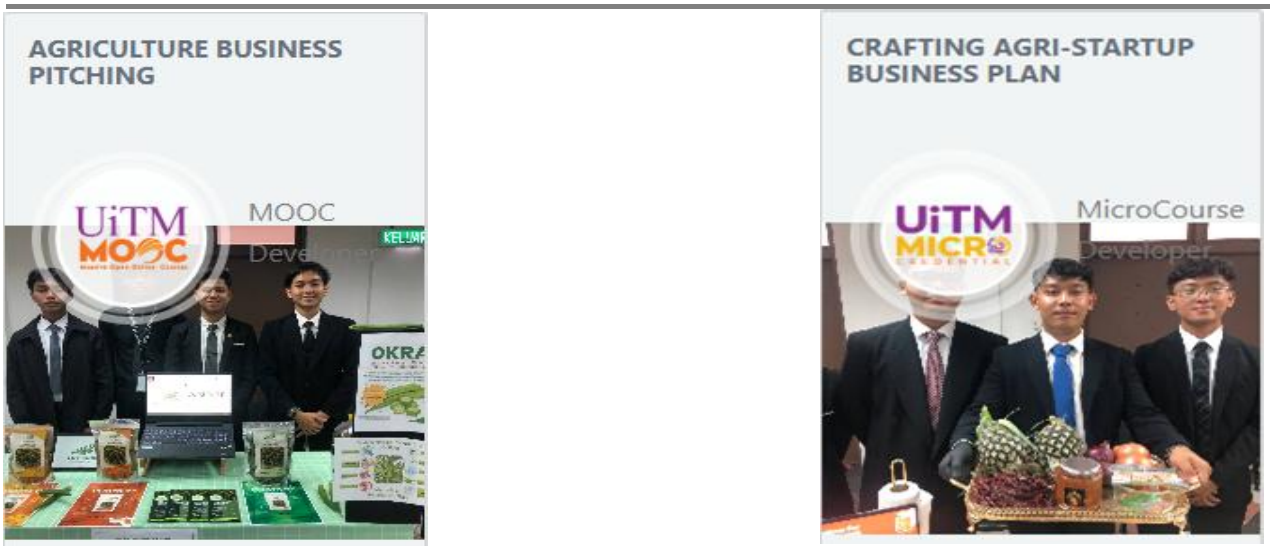


(a) (b)

Figure 1. Interfaces of the (a) MOOC course (*AGB283 Agricultural Business Pitching*) and (b) the MC module (*UMC579 Crafting Agri-Startup Business Plan*) on the UFuture platform.

Table 3. Research instrument (pre and post-test): Items in Section A (Business Pitching Skills), Section B (Student Engagement), and Section C (Perceived Learning Experience)

Section A: Business Pitching Skills	
1	I am confident in clearly presenting my business idea to an audience.
2	I can effectively persuade others of the value of my agri-business idea.
3	I am able to structure my business pitch in a logical and compelling way.
4	I feel confident handling questions and feedback during a business pitch.
5	I can deliver my pitch with clarity, confidence, and enthusiasm.
Section B: Student Engagement	
1	I was actively engaged with the learning activities throughout the course/module.
2	I found the learning materials interesting and motivating.
3	I participated consistently in discussions, exercises, or interactive tasks.
4	The course/module kept me focused and encouraged me to complete the activities.
5	I felt encouraged to learn independently beyond the course/module content.
Section C: Perceived Relevance of Learning	
1	The content of the module is directly applicable to real-world agri-business pitching.
2	I believe the knowledge and skills gained will benefit my future entrepreneurial career.
3	The module provided practical examples relevant to my field of study.
4	I can see how the skills learned can be applied to starting or managing a business.
5	Overall, the module is highly relevant and valuable to my academic and career goals.
*Each item can be measured using a **5-point Likert scale**: • 1 = Strongly Disagree • 2 = Disagree • 3 = Neutral • 4 = Agree • 5 = Strongly Agree	

RESULTS AND DISCUSSION

Comparative Effectiveness of Micro-credentials and MOOCs on Pitching Skills

A paired-samples t-test revealed that students' pitching skills improved significantly after completing the micro-credential (post-test) compared to the MOOC (pre-test), $t(32) = 13.36$, $p < .001$, 95% CI [0.94, 1.28]. Specifically,

although students showed modest gains during the MOOC stage, $t(32) = 3.14$, $p = .004$, 95% CI [0.10, 0.47], the improvements were substantially greater after the micro-credential compared to the MOOC, $t(32) = 8.39$, $p < .001$, 95% CI [0.63, 1.03]. These results suggest that while MOOCs provided a useful foundation, the MC enabled deeper mastery of pitching skills.

Comparative Analysis of Student Engagement: MOOC vs Micro-credential

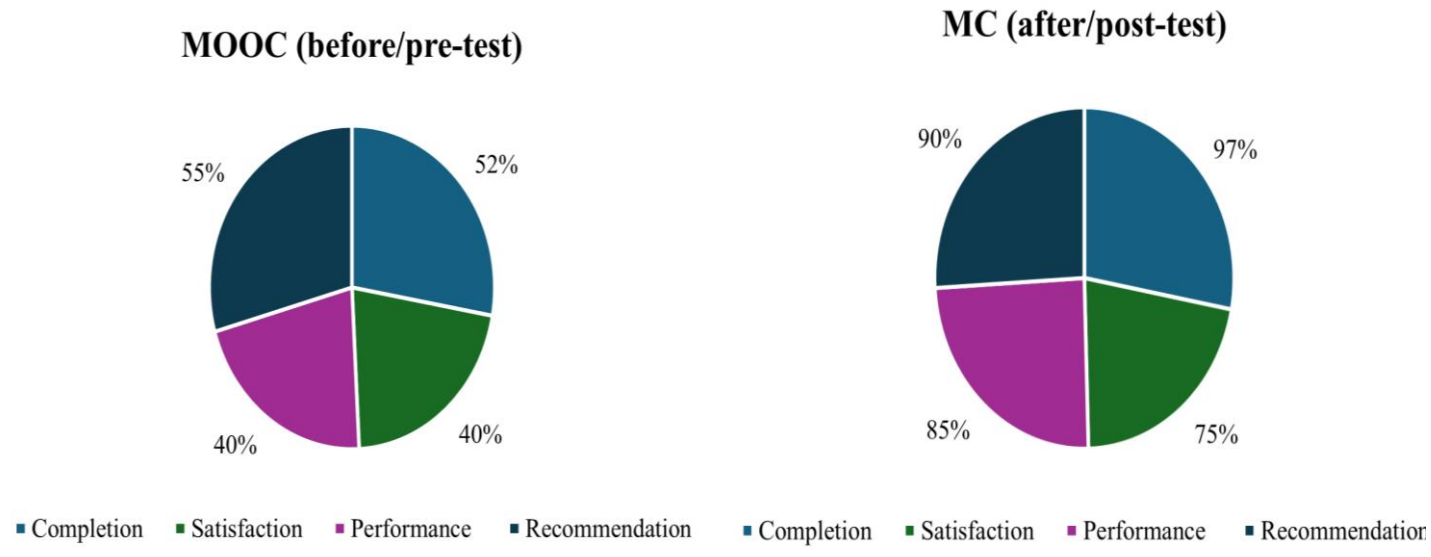
Student engagement was significantly higher after the micro-credential (post-test) (Fig. 2b) compared to the MOOC (pre-test) (Fig. 2a), $t(32) = 11.75$, $p < .001$, 95% CI [0.94, 1.34]. During the MOOC stage, engagement showed only moderate gains, $t(32) = 2.59$, $p = .015$, 95% CI [0.08, 0.65]. However, engagement increased substantially after completing the micro-credential compared to the MOOC, $t(32) = 6.29$, $p < .001$, 95% CI [0.53, 1.03]. This indicates that the structured, targeted nature of the MC fostered higher levels of learner engagement than the broader MOOC.

Perceived Relevance Gains after MC Learning

Perceived relevance was significantly higher post-micro-credential (Fig. 2b) compared to the MOOC (pre-test) (Fig. 2a), $t(32) = 9.12$, $p < .001$, 95% CI [0.79, 1.25]. While the MOOC showed only marginal improvements, $t(32) = 2.04$, $p = .050$, 95% CI [0.00, 0.49], the MC stage produced substantial gains, $t(32) = 6.95$, $p < .001$, 95% CI [0.55, 1.00]. This suggests that learners found the MC more relevant to their academic and entrepreneurial needs compared to the MOOC.

Students perceive their learning as more valuable because the MC contextualises pitching skills within sustainability-driven agribusiness models. This helps them see their learning as purposeful and future-oriented, beyond just academic requirements. In addition, students' perception of learning gains is enhanced because the MC emphasises ethical, respectful, and community-focused communication. They feel more confident not just in "delivering a pitch," but in advocating ideas responsibly, which strengthens their sense of achievement and personal growth (Fig. 3e).

Within the MC, student feedback indicated that the assessment design, comprising formative assessment through creating a business plan (40%) and pitching the business plan (30%), as well as a summative assessment through the Final Test (20%), was both appropriate and ideal. They highlighted that the business plan exercise was crucial in developing their ability to design viable agro-based ventures, while the pitching session enhanced their communication, persuasion, and entrepreneurial confidence



(a) (b)

Figure 2. Comparison of student outcomes before (MOOC/pre-test) and after (MC/post-test) intervention, showing completion, satisfaction, performance, and recommendation rates.

Course / Module Completion

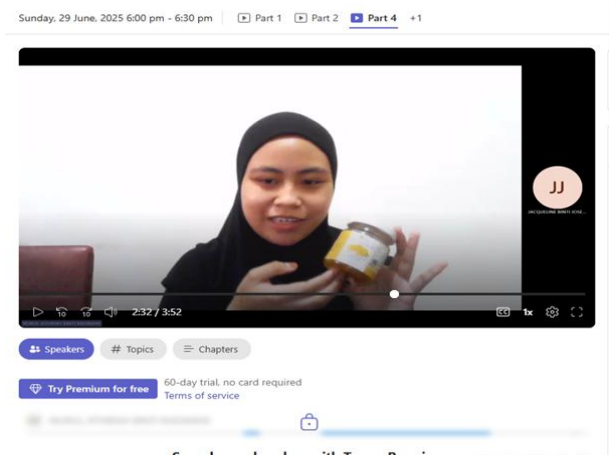
Completion rates were notably higher for MC (97%) compared to MOOC (52%) (Fig. 2a & 2b). This highlights the advantage of MCs' modular and time-bound structure, which promotes sustained learner commitment. One possible reason is that the MOOC syllabus was broader and more general in scope, which may not have fully addressed the specific skills students sought to develop (Parsons et al., 2023). Gopio & Cheung (2021) noted that course completion is not the primary objective for many students who enrol in MOOCs, resulting in consistently low completion rates worldwide. In contrast, the MC provided a focused and targeted curriculum on pitching skill enhancement, making the content more relevant and directly applicable to learners' needs. The specificity of the MC, combined with clear outcomes and assessment checkpoints, encouraged learners to remain committed until completion. These findings reaffirm prior research emphasising that skill-focused and competency-driven programs achieve stronger completion rates than generalised online courses.

Although Joseph (2025) demonstrates that MOOCs can effectively enhance agropreneurship students' pitching skills, with notable improvements in confidence and comprehension, the present study provides further evidence that MCs yield superior outcomes. While MOOCs are valuable for introducing foundational concepts and building initial confidence, their broader scope may limit opportunities for targeted practice and mastery (Parsons et al., 2023). In contrast, the MC examined in this study adopted a competency-based and skill-specific design, leading to significantly greater improvements in pitching performance, student engagement, and perceived relevance. These findings suggest that MOOC and MC are not mutually exclusive; rather, MOOCs serve as a useful entry point, while MC provide the depth and contextualization necessary for advancing pitching skills to a higher level of proficiency.

Nonetheless, the 97% completion rate and improved pitching performance further confirm that the MC was effective in cultivating both entrepreneurial knowledge and broader lifelong learning competencies demanded in the 21st-century education landscape as outlined in a study by Vadarajan et al. (2023).

(a)

(b)



(c)

(d)

(e)

Figure 3. Innovative teaching and learning strategies integrated into the module: (a) teaching video developed using Instagram Reels template; (b) interactive teaching materials created with PoWToon; (c) learning activities and assessments supported by AI coaching through Microsoft Speaker Coach; (d) AI-driven gamification activities designed with Educaplay, and (e) A student delivering a face-to-face business pitching presentation on an agro-food product to the instructor after receiving AI coaching via Microsoft Speaker Coach.

Satisfaction

Learner satisfaction improved substantially after completing the MC (75%) compared to the MOOC (40%). This suggests that students perceived MCs as more relevant, manageable, and engaging. One contributing factor is the inclusion of AI-driven coaching through Microsoft Teams Speaker Coach (Fig. 3c) which provided learners with personalized feedback and opportunities to practice pitching in an interactive way (Fig. 3c). This practical, technology-enhanced activity contrasted with the MOOC's more theory-oriented approach, making the MC experience more impactful and directly applicable to learners' entrepreneurial needs. The integration of AI coaching not only fostered a stronger sense of fulfilment but also enhanced learner confidence. The MC was further strengthened using brief, interactive teaching videos (Fig. 3a and 3b) that promoted engagement and clarity, as well as AI-driven gamification activities designed with Educaplay (Fig. 3d) which provided immediate feedback and reinforced entrepreneurial concepts in an enjoyable and learner-centered manner as addressed by Wahyudi et al. (2025).

Performance

Performance levels rose from 40% (MOOC) to 85% (MC), underscoring the greater impact of MCs on actual skill acquisition and application. This outcome is consistent with the t-test findings, which demonstrated significant improvements in pitching skills after the MC compared to the MOOC. One key reason is the competency-based and assessment-driven design of micro-credentials, which requires learners to demonstrate mastery of specific outcomes rather than passively consuming content. This structure ensures that learners engage in repeated practice, receive targeted feedback, and apply their knowledge in authentic scenarios.

In contrast, the MOOC served primarily as an introductory platform, offering broad exposure to concepts but with limited opportunities for applied practice. While MOOCs are effective in building awareness and comprehension, the absence of focused assessment activities may explain the lower performance outcomes observed (Guo, 2025). The MC, by integrating practical tasks such as pitching simulations and AI-enabled coaching (Microsoft Teams Speaker Coach) (Fig. 3c), created an environment where learners could refine their delivery, receive immediate feedback, and build confidence through iteration.

Evidence from Alyoussef (2021) suggests that MOOCs can significantly contribute to academic performance. However, when it comes to fostering specific competencies such as communication and pitching, MOOCs may

fall short. In such cases, MC provide a more suitable framework, offering tailored, skill-based training aligned with professional demands. These findings justify the argument that MC not only transfer knowledge but also bridge the gap between learning and application, leading to higher performance outcomes. This has important implications for entrepreneurship education, where the ability to apply skills in real-world contexts is more critical than theoretical understanding alone.

CONCLUSION

This study has demonstrated that e-learning MCs can serve as an effective pedagogical tool in enhancing agriculture business pitching skills among agro-ntrepreneurial students. The results suggest that MCs provide not only targeted knowledge and practical pitching competencies but also foster learner autonomy, flexibility, and applied learning, which are the attributes central to entrepreneurial success. Notably, the micro-credential developed in this study complements and aligns with the principles of 21st-century pedagogy. Nonetheless, this study is limited by its small sample size and single-institution context, which may restrict the generalisability of the findings. Future research is recommended to employ larger and more diverse samples, and comparative or control-group approaches to further examine the sustained impact of AI-supported communication tools across different educational and cultural contexts.

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