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BRIDGING ENTREPRENEURSHIP EDUCATION INEQUALITY THROUGH ARTIFICIAL INTELLIGENCE

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Keyword

Artificial Intelligence (AI), Digital Learning, Educational Equity, Entrepreneurship Education

Abstract

Over the past decade, rapid technological advancements have transformed educational practices, particularly during the COVID-19 pandemic, which accelerated the shift to digital learning. While these developments have broadened access to education, their effectiveness in fields like entrepreneurship education, especially in developing countries such as Indonesia, remains under-explored. This study examines the perspectives of Indonesian students on the efficacy of online and offline learning methods in entrepreneurship education, aiming to identify the most effective technological tools for supporting educational equity across the nation. Utilising a mixed-methods approach, including quantitative surveys and qualitative interviews, the study reveals a significant preference for offline learning due to its interactive and hands-on nature. However, challenges such as limited topic selection and variability in teaching quality were noted. Conversely, online learning is valued for its flexibility and accessibility, particularly in remote areas, though technical issues like poor internet connectivity and reduced interactivity hinder it. This study highlights the potential of Artificial Intelligence (AI) to bridge these gaps by offering personalised interactive learning experiences that combine the benefits of both online and offline modalities. AI-driven platforms could address regional disparities in educational resources, providing all students with equal opportunities to develop entrepreneurial skills. The findings underscore the need for more tailored and dynamic educational approaches, suggesting that integrating AI into entrepreneurship education could enhance learning outcomes and promote greater educational equity across Indonesia. Future research should explore the implementation of AI in educational models to further understand its impact on student learning and regional development.

INTRODUCTION

Over the past decade, rapid technological advancements have revolutionised educational practices, transforming traditional face-to-face classrooms into dynamic, interconnected, remote learning environments. This shift has been particularly pronounced during the COVID-19 pandemic, which accelerated the adoption of digital learning, remote classes, and other interactive innovations across various disciplines (1). While these developments have significantly impacted fields like science and engineering, they have also begun influencing social sciences, including entrepreneurship education (2,3)

Entrepreneurship education is critical in fostering economic growth and innovation, particularly in developing countries like Indonesia, where equitable access to quality education is essential for regional development and social mobility (4). Despite the importance of entrepreneurship learning, there is a noticeable gap in research on the effectiveness of various

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learning approaches, especially in technological advancements (5). Traditional methods of learning entrepreneurship, which prioritise critical thinking and diverse perspectives, may or may not align with the benefits offered by digital and remote learning tools (6).

In Indonesia, the challenges of educational inequality are exacerbated by the country's diverse geography and socio-economic disparities. Students in urban areas often have access to better resources and educational opportunities than their counterparts in rural or remote regions (7,8). Technological interventions, such as online learning platforms and digital resources, hold the potential to bridge this gap by providing students across the nation with equal access to quality entrepreneurship education (9,10).

This study seeks to explore the perspectives of Indonesian students on the more effective methods for learning entrepreneurship. By examining their preferences and perceptions of current online and offline learning modalities, this research aims to identify the types of technology that can better support entrepreneurship education and promote better educational equity across different regions of Indonesia. The findings will offer valuable insights into how Artificial Intelligence can be leveraged to enhance learning outcomes and ensure that all students, regardless of their location, have an equal opportunity to develop the skills necessary for entrepreneurial success.

METHOD

This study employs a mixed-methods approach, combining quantitative and qualitative research methods to comprehensively understand the research problem. The mixed-methods approach is justified by the need to explore broad trends in student preferences and perceptions, as well as to gain deeper insights into their experiences and challenges in entrepreneurship education (51)The quantitative component involves distributing questionnaires via Google Forms to students enrolled in business-related courses at higher education institutions across 21 provinces in Indonesia. 172 valid responses were collected using convenience sampling, ensuring a diverse representation of students from various geographic and socio-economic backgrounds.

The questionnaire comprises Likert-scale and multiple-choice questions designed to capture students' perceptions, preferences, and attitudes toward the effectiveness of online and offline learning methods. Additionally, respondents were asked about their willingness to participate in follow-up interviews. The qualitative component consists of in-depth interviews with a subset of 13 respondents who volunteered for further participation. These interviews were conducted to gather detailed qualitative data on students' experiences, motivations, and challenges related to entrepreneurship learning. The interviews utilised open-ended questions to encourage participants to share their insights and personal experiences freely.

The methodology flow can be seen from Figure 1. Data analysis was conducted using SPSS version 29 for the quantitative data, Wilcoxon Signed-Rank tests to compare perceptions of the effectiveness of online versus offline learning. The qualitative data were analysed through thematic analysis using NVIVO version 12, allowing for the identification of key themes and patterns in students' responses. This methodological approach aligns with the study's objectives, providing a broad overview of a detailed exploration of contextual factors influencing students' learning experiences.

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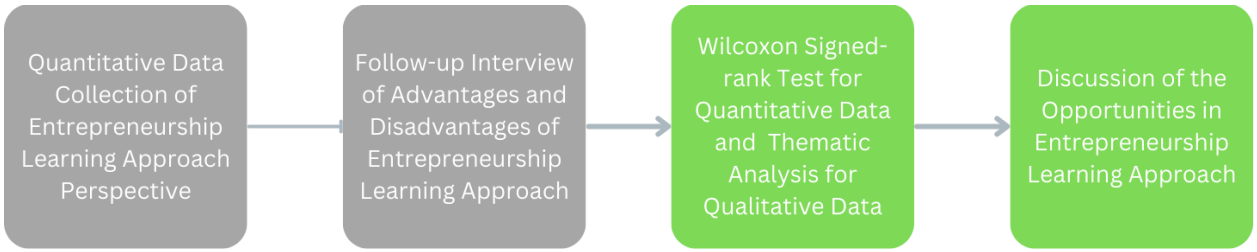

Figure 1. Methodology Flow Design

RESULTS

Perspective of Effectiveness

A Wilcoxon signed-rank test was used to compare the perceived effectiveness of offline versus online learning. Participants rated offline learning significantly higher (Mean Rank = 36.37) than online learning (Mean Rank = 28.50), with $Z = -5.556$ and $p < .001$. This statistically significant result highlights a clear preference for offline learning methods over online learning, particularly in entrepreneurship education. The negative Z-value further underscores that offline learning was consistently rated as more effective.

Challenges and Opportunities

Digital Learning Challenges

The qualitative analysis revealed that participants faced significant challenges with online learning, including the need for high-speed internet, large internet quotas, and less interactive learning sessions. For example, Ester from Manokwari noted, "The limitation of online is a network issue, quota limit, and you cannot ask directly because you just see the digital video." Similarly, Jonathan from Kepulauan Riau emphasised the lack of real-time interaction, stating, "The problem in online learning is the network/signal issue, and we cannot ask directly if we have questions, even in Zoom." These challenges highlight the technical barriers that can impede the effectiveness of online learning, especially in regions with limited infrastructure.

Offline Learning Challenges

Offline learning, while preferred, was not without its drawbacks. Participants pointed out issues such as limited topic selection and variability in teaching quality. Jonathan from Kepulauan Riau mentioned, "In offline learning, we have to follow the topic being taught, even though we might want to learn something else." Erens from Sorong added, "If the presentation or explanation of the material is less interesting, it will feel very boring for students, and we cannot ask more because it is not interactive anymore."

Opportunities with AI-Driven Learning

The potential of Artificial Intelligence (AI) in education offers promising solutions to the challenges identified with both offline and online learning. AI-driven learning systems can provide interactive and adaptive learning experiences without needing high-speed internet or large data quotas. These systems can offer real-time feedback and personalised learning paths, addressing the limitations of traditional and online learning methods. AI can also facilitate a more interactive learning environment, similar to offline learning, but with the added benefits of flexibility and accessibility, particularly in remote areas.

Suggestions for Improving Entrepreneurship Education

Participants suggested integrating offline and online learning approaches to enhance entrepreneurship education. Budi from Jakarta proposed, "Combining offline and online learning is the most effective media because I can explore any lesson without restrictions through the internet and discuss a problem with the teacher at one time." Similarly, Rizal from Sorong and Silas from Merauke

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emphasised that a combination approach would offer a more comprehensive and effective learning experience, better supporting entrepreneurial development due to easy access to any lesson from the internet and personalised feedback from face-to-face learning. AI's ability to facilitate this blend could provide a solution that combines the best aspects of both learning environments, offering a more interactive and effective learning experience. The comparison can be seen from Table 1.

Table 1. Comparison Table: Traditional, Online, and AI-Driven Learning

Features	Offline Learning	Current Online Learning	AI-Driven Learning
High-speed internet requirement	No	Yes	No
Large internet quota requirement	No	Yes	No
Interactivity	High	Low	High
Flexibility	Low	High	High
Real-time feedback	High	Low	High
Accessibility in remote areas	Limited	Low	Moderate to High
Cost-effectiveness	Varies	Varies	Varies
Personalised learning experience	Low	Low	High

DISCUSSION

The results of this study highlight the diverse perspectives of students across Indonesia regarding the effectiveness of current online and offline learning methods in entrepreneurship education. The significant preference for offline learning over online learning aligns with existing literature that emphasises the importance of interaction and personalised feedback in entrepreneurship education (6). Offline learning environments facilitate face-to-face communication, immediate feedback, and interactive discussions, which are crucial for developing entrepreneurial skills and fostering critical thinking (52).

However, the challenges associated with offline learning, such as limited topic selection and the potential for unengaging teaching methods, cannot be overlooked. These challenges suggest a need for more dynamic and adaptable offline learning environments that can better cater to the diverse interests and learning styles of students (53).

The study's findings also underscore the potential of online learning platforms to offer flexibility and accessibility, particularly for students in remote or underdeveloped regions. The freedom to learn at one's own pace and convenience is a significant advantage of online learning, as highlighted by participants from various regions. This aligns with the broader trend of increasing digitalisation in education, which aims to bridge gaps in educational access and equity(3). However, the drawbacks of online learning, such as network issues and the lack of interactivity, indicate that current digital platforms may not fully meet the needs of entrepreneurship students, who benefit from more interactive and practical learning experiences(54–56).

In this context, integrating Artificial Intelligence (AI) into the online learning models offers a promising solution. AI has the potential to create more personalised and interactive learning experiences by adapting content to individual student needs and facilitating real-time feedback and support(25,57). For example, AI-driven platforms can adjust the lesson delivery based on the student's knowledge and perspectives, allowing students to engage in tailored learning while benefiting from the flexibility of online education(58). Moreover, AI can enhance the interactivity of digital learning environments by enabling more dynamic and responsive communication channels, addressing the issue of limited interaction in traditional online learning setups (3).

Implementing AI in entrepreneurship education could also address regional disparities by providing students in remote areas with access to high-quality, interactive learning experiences

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tailored to their specific contexts and needs. By combining offline and online learning strengths, AI-powered online learning models could offer a more comprehensive and effective approach to entrepreneurship education, ultimately supporting the development of entrepreneurial skills across diverse student populations(20,55).

CONCLUSION

This study provides valuable insights into the effectiveness of online and offline learning methods in entrepreneurship education, as students from various regions across Indonesia perceive. The findings highlight the strengths and weaknesses of each approach, with offline learning being preferred for its interactive and hands-on nature. In contrast, online learning is valued for its flexibility and accessibility.

The challenges identified in online and offline learning environments underscore the need for more tailored and dynamic educational approaches. In this regard, integrating AI into online learning models offers a promising avenue for enhancing the effectiveness of entrepreneurship education. By leveraging AI's ability to personalise learning experiences and facilitate interactive, real-time communication, educators can create more engaging and effective learning environments that cater to the diverse needs of students across Indonesia.

Ultimately, adopting AI-driven online learning in entrepreneurship education could play a crucial role in addressing regional disparities in educational access and quality, supporting the development of entrepreneurial skills and fostering economic growth across the nation. Future research should explore the implementation of such models in greater detail, examining their impact on learning outcomes and their potential to promote educational equity in Indonesia and beyond.

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REFERENCES

Zarei S, Mohammadi S. Challenges of higher education related to e-learning in developing countries during COVID-19 spread: a review of the perspectives of students, instructors, policymakers, and ICT experts. Environmental Science and Pollution Research. 2022 Dec 7;29(57):85562–8.

Means B, Toyama Y, Murphy R, Bakia M, Jones K. Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies. 2009;

Palvia S, Aeron P, Gupta P, Mahapatra D, Parida R, Rosner R, et al. Online Education: Worldwide Status, Challenges, Trends, and Implications. Journal of Global Information Technology Management. 2018 Oct 2;21(4):233–41.

Cazeri GT, Anholon R, Rampasso IS, Quelhas OLG, Leal Filho W. Preparing future entrepreneurs: reflections about the COVID-19 impacts on the entrepreneurial potential of Brazilian students. Journal of Work-Applied Management. 2021 Sep 21;13(2):277–83.

Ahmed T, Chandran VGR, Klobas J. Specialized entrepreneurship education: does it really matter? Fresh evidence from Pakistan. International Journal of Entrepreneurial Behavior & Research. 2017 Jan 9;23(1):4–19.

Neck HM, Corbett AC. The Scholarship of Teaching and Learning Entrepreneurship. Entrepreneurship Education and Pedagogy. 2018 Jan 9;1(1):8–41.

Purnastuti L, Izzaty RE. Access and Equity in Higher Education in Indonesia. In: Widening Higher Education

ISSN (Online): 2961-9602

Participation. Elsevier; 2016. p. 119–34.

Indra I, Nazara S, Hartono D, Sumarto S. Inequality of opportunity among Indonesian school children. International Journal of Development Issues. 2020 Mar 23;19(1):119–44.

Lyons TS, Lyons JS, Jolley GJ. Entrepreneurial skill-building in rural ecosystems. Journal of Entrepreneurship and Public Policy. 2019 Dec 23;9(1):112–36.

Cumming D, Johan S. The Differential Impact of the Internet on Spurring Regional Entrepreneurship. Entrepreneurship Theory and Practice. 2010 Sep 1;34(5):857–84.

Ndibalema P. Constraints of transition to online distance learning in Higher Education Institutions during COVID-19 in developing countries: A systematic review. E-Learning and Digital Media. 2022 Nov 8;19(6):595–618.

Palvia S, Aeron P, Gupta P, Mahapatra D, Parida R, Rosner R, et al. Online Education: Worldwide Status, Challenges, Trends, and Implications. Journal of Global Information Technology Management. 2018 Oct 2;21(4):233–41.

Pokhrel S, Chhetri R. A Literature Review on Impact of COVID-19 Pandemic on Teaching and Learning. Higher Education for the Future. 2021 Jan 19;8(1):133–41.

Gaskell A, Mills R. The quality and reputation of open, distance and e-learning: what are the challenges? Open Learning: The Journal of Open, Distance and e-Learning. 2014 Sep 2;29(3):190–205.

Bose PS. Technofetishism and online education: globalizing geography through virtual worlds. Journal of Geography in Higher Education. 2014 Jan 2;38(1):28–39.

Abou-Khalil V, Helou S, Khalifé E, Chen MA, Majumdar R, Ogata H. Emergency Online Learning in Low-Resource Settings: Effective Student Engagement Strategies. Educ Sci (Basel). 2021 Jan 8;11(1):24.

Ofori Atakorah P, Honlah E, Atta Poku Jnr P, Frimpong E, Achem G. Challenges to online studies during COVID-19: The perspective of Seventh-day Adventist College of Education students in Ghana. Cogent Education. 2023 Dec 31;10(1).

Joaquin JJB, Biana HT, Dacela MA. The Philippine Higher Education Sector in the Time of COVID-19. Front Educ (Lausanne). 2020 Oct 22;5.

Perera E, Gamage KAA. Learning Remotely during a Pandemic: Are Students in a Developing Country Fully Equipped with Tools for Swift Changes? Sustainability. 2021 Aug 3;13(15):8635.

Giuggioli G, Pellegrini MM. Artificial intelligence as an enabler for entrepreneurs: a systematic literature review and an agenda for future research. International Journal of Entrepreneurial Behavior & Research. 2023 May 4;29(4):816–37.

Sayed WS, Noeman AM, Abdellatif A, Abdelrazek M, Badawy MG, Hamed A, et al. AI-based adaptive personalized content presentation and exercises navigation for an effective and engaging E-learning platform. Multimed Tools Appl. 2023 Jan 29;82(3):3303–33.

Kabudi T, Pappas I, Olsen DH. AI-enabled adaptive learning systems: A systematic mapping of the literature. Computers and Education: Artificial Intelligence. 2021;2:100017.

Torres Kompen R, Edirisingha P, Canaleta X, Alsina M, Monguet JM. Personal learning Environments based on Web 2.0 services in higher education. Telematics and Informatics. 2019 May;38:194–206.

Lévesque M, Obschonka M, Nambisan S. Pursuing Impactful Entrepreneurship Research Using Artificial Intelligence. Entrepreneurship Theory and Practice. 2022 Jul 16;46(4):803–32.

Ng DTK, Leung JKL, Su J, Ng RCW, Chu SKW. Teachers' AI digital competencies and twenty-first century skills in the post-pandemic world. Educational technology research and development. 2023 Feb 21;71(1):137–61.

Neck HM, Greene PG. Entrepreneurship Education: Known Worlds and New Frontiers. Journal of Small Business Management [Internet]. 2011 Jan 1 [cited 2024 Aug 4];49(1):55–70. Available from: https://onlinelibrary.wiley.com/doi/full/10.1111/j.1540-627X.2010.00314.x

Sutter C, Bruton GD, Chen J. Entrepreneurship as a solution to extreme poverty: A review and future research directions. J Bus Ventur. 2019 Jan;34(1):197–214.

Iyer VG. Education Coupled with Entrepreneurial Process Approach towards Sustainable Development. Procedia Soc Behav Sci. 2015 Apr;177:147–61.

Binks M, Starkey K, Mahon CL. Entrepreneurship education and the business school. Technol Anal Strateg Manag [Internet]. 2006 Feb [cited 2024 Aug 4];18(1):1–18. Available from: https://www.tandfonline.com/doi/abs/10.1080/09537320500520411

Suzanne L. Reinman. Open Knowledge Repository. Reference Reviews. 2015 Jul 6;29(5):21–2.

du Toit A, Gaotlhobogwe M. A Neglected Opportunity: Entrepreneurship Education in the Lower High School Curricula for Technology in South Africa and Botswana. African Journal of Research in Mathematics, Science and Technology Education. 2018 Jan 2;22(1):37–47.

Gulati S. Technology-Enhanced Learning in Developing Nations: A review. The International Review of Research in Open and Distributed Learning [Internet]. 2008 Feb 26 [cited 2024 Aug 4];9(1). Available from: https://www.irrodl.org/index.php/irrodl/article/view/477/1012

Salemink K, Strijker D, Bosworth G. Rural development in the digital age: A systematic literature review on unequal ICT availability, adoption, and use in rural areas. J Rural Stud. 2017 Aug;54:360–71.

Asongu SA, Orim SMI, Nting RT. Inequality, information technology and inclusive education in sub-Saharan Africa. Technol Forecast Soc Change. 2019 Sep;146:380–9.

Onitsuka K, Hidayat ART, Huang W. Challenges for the next level of digital divide in rural Indonesian communities. THE ELECTRONIC JOURNAL OF INFORMATION SYSTEMS IN DEVELOPING COUNTRIES. 2018 Mar 20;84(2).

Sujarwoto S, Tampubolon G. Spatial inequality and the Internet divide in Indonesia 2010–2012. Telecomm Policy. 2016 Jul;40(7):602–16.

du Toit A, Kempen EL. Effectual Structuring of Entrepreneurship Education: Guidelines for Overcoming Inadequacies in the South African School Curriculum. Africa Education Review. 2020 Jul 3;17(4):41–55.

Suryadarma D, Jones GW. Education in Indonesia [Internet]. Institute of Southeast Asian Studies; 2013. (Indonesia update series). Available from: https://books.google.co.id/books?id=t6bhAwAAQBAJ

Byun S yong, Meece JL, Irvin MJ. Rural-Nonrural Disparities in Postsecondary Educational Attainment Revisited. Am Educ Res J. 2012 Jun 1;49(3):412–37.

Xiang L, Stillwell J. Rural–Urban Educational Inequalities and Their Spatial Variations in China. Appl Spat Anal Policy. 2023 Jun 6;16(2):873–96.

Oosterbeek H, van Praag M, Ijsselstein A. The impact of entrepreneurship education on entrepreneurship skills and motivation. Eur Econ Rev. 2010 Apr 1;54(3):442–54.

Sing Yun W. Digitalization challenges in education during COVID-19: A systematic review. Cogent Education. 2023 Dec 31;10(1).

Aligica PD, Florian B. Entrepreneurship and education. The missing link in international development theory and practice. International Journal of Business and Globalisation. 2008;2(1):28.

Makgato M. Identifying Constructivist Methodologies and Pedagogic Content Knowledge in the Teaching and Learning of Technology. Procedia Soc Behav Sci. 2012;47:1398–402.

Mayer RE. Should There Be a Three-Strikes Rule against Pure Discovery Learning? The Case for Guided Methods of Instruction. American Psychologist. 2004 Jan;59(1):14–9.

Bell R, Bell H. Applying educational theory to develop a framework to support the delivery of experiential entrepreneurship education. Journal of Small Business and Enterprise Development. 2020 Oct 2;27(6):987–1004.

Sheppard MJ. A case study of a radical constructivist approach to teaching innovation. Journal of Education for Business. 2020 Nov 16;95(8):559–66.

Scott JM, Penaluna A, Thompson JL. A critical perspective on learning outcomes and the effectiveness of experiential approaches in entrepreneurship education. Education + Training. 2016 Jan 11;58(1):82–93.

Pittaway L, Huxtable-Thomas L, Hannon P. Learning and Educational Programs for Entrepreneurs. In: The SAGE Handbook of Small Business and Entrepreneurship. 1 Oliver's Yard, 55 City Road London EC1Y 1SP : SAGE Publications Ltd; 2018. p. 471–88.

Bandera C, Collins R, Passerini K. Risky business: Experiential learning, information and communications technology, and risk-taking attitudes in entrepreneurship education. The International Journal of Management Education. 2018 Jul;16(2):224–38.

Creswell JW, Creswell JD. Research design: Qualitative, quantitative, and mixed methods approaches. Sage publications; 2017.

Lackéus M. Comparing the impact of three different experiential approaches to entrepreneurship in education. International Journal of Entrepreneurial Behaviour and Research. 2020 Aug 3;26(5):937–71.

Ahmed T, Chandran VGR, Klobas JE, Liñán F, Kokkalis P. Entrepreneurship education programmes: How learning, inspiration and resources affect intentions for new venture creation in a developing economy. The International Journal of Management Education. 2020 Mar;18(1):100327.

Liguori E, Winkler C. From Offline to Online: Challenges and Opportunities for Entrepreneurship Education Following the COVID-19 Pandemic. Entrepreneurship Education and Pedagogy. 2020 Oct 4;3(4):346–51.

Chen L, Ifenthaler D, Yau JYK. Online and blended entrepreneurship education: a systematic review of applied educational technologies. Entrepreneurship Education. 2021 Jun 16;4(2):191–232.

Lee K, Fanguy M, Bligh B, Lu XS. Adoption of online teaching during the COVID-19 Pandemic: a systematic analysis of changes in university teaching activity. Educ Rev (Birm). 2022 Apr 16;74(3):460–83.

Kamalov F, Santandreu Calonge D, Gurrib I. New Era of Artificial Intelligence in Education: Towards a Sustainable Multifaceted Revolution. Sustainability. 2023 Aug 16;15(16):12451.

Bhutoria A. Personalized education and Artificial Intelligence in the United States, China, and India: A systematic review using a Human-In-The-Loop model. Computers and Education: Artificial Intelligence. 2022;3:100068.