

The Impact of Digital Entrepreneurship Courses and Motivation on Fostering a Green Entrepreneurial Spirit in Students' Perceptions

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Article Info

Article history:

Received: Sep 22, 2024

Revised: Dec 23, 2024

Accepted: Dec 30, 2024

DOI: [10.58418/ijeqqr.v3i2.120](https://doi.org/10.58418/ijeqqr.v3i2.120)

How to cite this article:

Kesa, D. D., Wu, M., Abdillah, F., Harjadi, D., & Ningsih, A. (2024). The Impact of Digital Entrepreneurship Courses and Motivation on Fostering a Green Entrepreneurial Spirit in Students' Perceptions. *International Journal of Educational Qualitative Quantitative Research*, 3(2), 46–55. <https://doi.org/10.58418/ijeqqr.v3i2.120>

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ABSTRACT

Digitalization and sustainability have become two essential pillars in shaping the entrepreneurial mindset of future generations, particularly among university students. Digital entrepreneurship education is increasingly relevant in preparing technology-driven entrepreneurs. Integrating sustainability values into higher education encourages students to become innovative green entrepreneurs. Through digital entrepreneurship courses and appropriate motivational support, students can develop businesses that are not only profitable but also environmentally responsible. This study aims to analyze the impact of digital entrepreneurship courses and motivation in fostering a green entrepreneurial spirit from students' perceptions and explore motivational factors contributing to developing a green entrepreneurial spirit. The research employed a quantitative associative method through a survey approach. Data were analyzed using partial and simultaneous hypothesis testing. The participants included 400 students from various universities in Indonesia, Taiwan, the United States of America, and the United Kingdom. The findings indicate that both partially and simultaneously, digital entrepreneurship courses and motivation significantly influence the development of a green entrepreneurial spirit in students' perceptions. In conclusion, integrating digital entrepreneurship education with a focus on sustainability, strengthened by strong student motivation, strategically contributes to shaping a new generation of entrepreneurs who are both technologically adept and socially responsible. The contributions of this study prove that instilling sustainability values in digital entrepreneurship education is a strategic approach to fostering environmentally responsible entrepreneurship in the digital era.

Keywords: Digital Entrepreneurship, Student Motivation, Green Entrepreneurial Spirit, Higher Education, Student Perception



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1. INTRODUCTION

The phenomenon of unemployment among university graduates continues to be a pressing concern for many countries. This issue arises because the number of higher education graduates far exceeds the availability of job opportunities in the market (Demissie et al., 2021; Mseleku, 2022). According to a study by Djubaedi et al. (2023), which draws upon insights from Japanese and Indonesian education experts, one of the primary causes of graduate unemployment is the mismatch between graduates' competencies and the

ever-evolving needs of the labor market. Supporting this, data from the Ministry of Education, Culture, Research, and Technology of Indonesia indicate that 80% of graduates are employed in fields unrelated to their area of academic specialization (Aisyah, 2021).

This statistic suggests that a significant proportion of university graduates struggle to find employment aligned with their educational background, with many being forced into sectors unrelated to their studies. Furthermore, Lestari (2024) emphasizes that another contributing factor is the low level of entrepreneurial intention among students and graduates, who often prefer pursuing stable employment in established companies rather than creating their own businesses. However, a study by Lu et al. (2021), which analyzed feedback from 13,954 university alumni, revealed widespread dissatisfaction with the entrepreneurial support systems offered by their universities. These findings highlight an urgent need to enhance entrepreneurial skills development and to reconfigure university curricula to better align with the realities of a rapidly changing workforce.

This situation reflects a structural imbalance between the higher education system and the demands of the labor market. If left unaddressed, it may have a long-term negative impact on national economic growth. In today's digital era, digital entrepreneurship offers significant opportunities for students to start their own ventures without being limited by physical location or conventional resources (Sánchez Vera & López Vicent, 2024; Sitaridis & Kitsios, 2024). On the other hand, green entrepreneurship presents a business approach centered on sustainability and environmental preservation, positioning itself as a forward-looking solution in response to global ecological challenges (Ahamer, 2021; Maulidian et al., 2024).

While digital technologies offer unprecedented convenience and innovation in business development, their rapid expansion often comes with environmental consequences. Resource overconsumption and the rise of electronic waste are among the negative impacts associated with technology-based businesses (Ha et al., 2022; Jha & Jha, 2024). At the same time, there is an increasing global urgency to reduce environmental damage caused by human activities (Nunes, 2023). Thus, the integration of green entrepreneurship principles in entrepreneurial education becomes crucial (Mambali et al., 2024). Green entrepreneurship emphasizes sustainable business models that blend economic goals with ecological responsibility. Green entrepreneurs aim to develop products and services that are both profitable and environmentally conscious (Qazi et al., 2021).

In the context of the Fourth Industrial Revolution (Industry 4.0) and the shift toward Society 5.0, universities are expected not only to produce academically competent graduates but also to prepare students who can adapt to the complexity of the digital economy (Akour & Alenezi, 2022; Goulart et al., 2022). One strategic response to this challenge is the promotion of digital entrepreneurship within academic environments. The growing interest of students in technology-based ventures signals the need for universities to evolve from being traditional knowledge transfer institutions into innovation hubs and incubators of digital entrepreneurial culture (Conti & Grimaldi, 2024; Nicholls-Nixon et al., 2024).

Integrating digital entrepreneurship and green entrepreneurship in higher education plays a key role in shaping future entrepreneurs who are technologically adept and socially and environmentally responsible (Mehraj et al., 2023; Mohd Razalli et al., 2024). When designed with sustainability-oriented approaches, courses in digital entrepreneurship can empower students to create innovative, efficient, and environmentally friendly businesses. As a result, students would acquire the technical skills to leverage digitalization in business and develop an understanding of how their ventures can contribute positively to environmental preservation.

Nonetheless, this transformation still faces several challenges. There remains a gap in curricula responsive to digital entrepreneurship's evolution. According to Budiman (2024), and Schimperna et al. (2021), limitations in technological infrastructure, lack of institutional support, and the persistence of conventional academic mindsets remain significant barriers to developing a progressive entrepreneurial ecosystem on campus. Hence, integrating digital entrepreneurship into the higher education system is urgently necessary. According to Dang et al. (2024), Timokhova et al. (2022), and Mohamed Hashim et al. (2022), universities must strategically equip students with digital competencies, creative thinking, and innovative mindsets, especially within sustainability values.

A more comprehensive and interdisciplinary educational approach is needed to cultivate the next generation of green digital entrepreneurs (Aji et al., 2023). This includes embedding sustainability principles into the core entrepreneurship curriculum, offering real-world projects related to environmental issues, and fostering strategic partnerships among universities, industry, and government sectors. Entrepreneurship education integrating digital competencies and ecological awareness will better prepare students to become future leaders capable of driving economic and environmental progress.

Integrating digital and green entrepreneurship in education encourages students to think critically and creatively (Mohd Razalli et al., 2024). They are challenged to develop innovative solutions that address environmental and social issues while remaining competitive in the global marketplace. Furthermore, courses that combine these two dimensions can foster collaboration between students and external stakeholders, such as government institutions, private enterprises, and non-governmental organizations, to

co-create environmentally conscious and digitally driven business solutions. These collaborations also broaden students' professional networks and open new business opportunities.

Novelty in entrepreneurial education emerges through the integration of digital entrepreneurship and green entrepreneurship principles, providing essential knowledge and tools for students aspiring to enter the future business landscape. This innovative approach equips students to launch tech-based ventures with a sustainability-oriented mindset. More importantly, those who understand how to utilize digital technologies to improve business efficiency while maintaining environmental responsibility will have a competitive advantage in an increasingly eco-conscious global market.

Moreover, motivation is critical in shaping students' green entrepreneurial spirit. Strong motivation drives students to pursue their entrepreneurial aspirations, even in the face of risks and challenges (Al-Fattal, 2024; Kah et al., 2022; Wiyono & Wu, 2022). Through effective pedagogy and exposure to successful green entrepreneur role models, students can be inspired to view entrepreneurship as a path to financial success and a means to contribute positively to society and the environment. This motivation encourages them to be more creative in designing environmentally friendly and innovative solutions for an evolving marketplace.

One effective way to nurture this motivation is by incorporating sustainability and social impact topics into the entrepreneurship curriculum (Rahmah, 2024; Saygin et al., 2024). Students who learn about digital entrepreneurship will understand how technology can reduce a business's carbon footprint, manage waste efficiently, and harness renewable resources. Consequently, they can design more sustainable and environmentally responsible business models. Additionally, providing insights into the market potential within green sectors will give students a deeper appreciation of the economic opportunities in sustainable products and services, encouraging them to pursue financially viable and environmentally impactful ventures. The novelty of this study lies in its exploration of how digital entrepreneurship courses, combined with student motivation, uniquely contribute to fostering a green entrepreneurial spirit from the students' perspective.

Aligned with these considerations, the present study aims to analyze the impact of digital entrepreneurship courses and motivation in fostering a green entrepreneurial spirit from students' perceptions and to explore motivational factors contributing to the development of a green entrepreneurial spirit. A comprehensive understanding of these dynamics is essential to design future curricula that are not only responsive to labor market needs but also capable of empowering students to become change agents in a sustainable digital economy.

2. METHOD

This study has used associative quantitative methods through surveys and partial and simultaneous hypothesis test analysis. This method aims to test students' perceptions of digital entrepreneurship courses and motivation to foster a green entrepreneurial spirit. The number of samples was taken using Hosmer–Lemeshow (Surjanovic & Loughin, 2024) with the justification that the number of student populations in several universities in Indonesia, Taiwan, the United States of America, and the United Kingdom who have received entrepreneurship courses is not known for certain. The theory states that if the population is not known for certain, the minimum sample is 387. Based on this theory, the participants in this study were 400 students. Participants from several campuses in Indonesia, Taiwan, the United States of America, and the United Kingdom were selected using the purposive sampling method, with the requirement that they had completed entrepreneurship courses. All participants provided informed consent.

The survey was conducted using a Google Form questionnaire, converting quantitative data using a Likert scale from 1 to 5. The questionnaire statements used indicators of student perceptions of digital entrepreneurship courses, student motivation to foster green entrepreneurship, and student green entrepreneurial spirit, which had been tested for validity and reliability. The valid and reliable student perception indicators are shown in Table 1.

Table 1. Questionnaire Indicators

Variables	Indicators
Student perceptions of digital entrepreneurship courses	<ol style="list-style-type: none"> 1. Student perceptions about the material's suitability to the digital industry's needs. 2. Student perceptions about practicality and real applications in learning. 3. Student perceptions about technological innovation in lectures. 4. Student perceptions about the role of lecturers and supervisors in facilitating creativity.
Students motivation	<ol style="list-style-type: none"> 5. Intrinsic motivation. 6. Extrinsic motivation. 7. Long-term career goals. 8. Awareness of the social and environmental impact of business.

Green entrepreneurial spirit	9. Students' intention to start a green business. 10. Students' creativity in creating environmentally friendly solutions. 11. Students' concern for sustainability in business ideas. 12. Students' courage to take risks in green innovation-based businesses. 13. Students' readiness to implement green entrepreneurial ideas.
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Before conducting the survey, all questionnaire indicators presented in Table 1 were subjected to validity and reliability testing using data from 60 participants. The validity test employed the Pearson product-moment correlation at a significance level of 0.05. With 60 participants, an item is considered valid if the correlation coefficient (r) generated by SPSS exceeds 0.254 (Praptomo et al., 2024). The SPSS output showed the following r -values for each indicator: Indicator 1 = 0.732; Indicator 2 = 0.806; Indicator 3 = 0.698; Indicator 4 = 0.776; Indicator 5 = 0.719; Indicator 6 = 0.811; Indicator 7 = 0.802; Indicator 8 = 0.773; Indicator 9 = 0.698; Indicator 10 = 0.721; Indicator 11 = 0.805; Indicator 12 = 0.799; and Indicator 13 = 0.853. As all r -values exceed the threshold of 0.254, it can be concluded that all items in Table 1 are valid.

Furthermore, the reliability analysis resulted in a Cronbach's Alpha coefficient of 0.802. According to Guilford's criteria (Jannah & Selvarajh, 2024), this value falls within the range of high reliability. In conclusion, the questionnaire demonstrates both validity and high reliability, confirming its effectiveness for data collection in this study.

Data analysis uses two types of data analysis methods to test the hypothesis in this study. The T-test is used to test the hypothesis partially, namely H1 and H2. The first hypothesis (H1): Entrepreneurship courses partially and significantly affect the fostering of green entrepreneurial spirit. The second hypothesis (H2): Motivation partially and significantly affects the fostering of green entrepreneurial spirit. The researcher uses the F-test to test the hypothesis simultaneously, namely the third hypothesis (H3). The third hypothesis (H3): Entrepreneurship courses and motivation have a simultaneous and significant effect on fostering green entrepreneurial spirit. Through these two analysis methods, researchers can see the influence of each variable and the combined influence on the dependent variable.

3. RESULTS AND DISCUSSION

3.1. Results

3.1.1. Students' Perceptions of Digital Entrepreneurship Courses

In an effort to understand students' views on the digital entrepreneurship course, a survey was conducted on 400 participants from various university backgrounds in Indonesia, Taiwan, the United States of America, and the United Kingdom. This survey aimed to identify students' general perceptions of the course's relevance, quality, and benefits in the ever-evolving digital world. The results of this survey are expected to provide a useful initial overview for future curriculum development. The complete results are presented in Table 2 below.

Table 2. Students' Perceptions of Digital Entrepreneurship Courses

Perception Category	% of Participants	Number of Participants	Description
Positive	67%	268	Found the course useful, relevant, and applicable
Negative	12%	48	Felt the content did not meet their needs or was too theoretical
Neutral/Other	21%	84	Gave no clear opinion
Total	100%	400	

In Table 2, the results show that the majority of students have a positive perception of the digital entrepreneurship course. They view the content as relevant to current needs and appreciate its practical value. However, a smaller portion voiced concerns about the course being too theory-heavy, while others felt they had insufficient exposure to provide a clear assessment. These findings highlight the importance of enhancing teaching methods to better align with students' expectations in the digital era.

3.1.2. Results of Partial Data Analysis

Partial data analysis has been conducted to determine the effect of each independent variable on the dependent variable separately. This test uses the T-test, which aims to see the significance of the contribution of digital entrepreneurship courses and student motivation to fostering a green entrepreneurial spirit. The complete results are presented in Table 3.

Table 3. Partial Analysis Results by Green Entrepreneurial Spirit as Dependent Variable

Independent Variable	Regression Coefficient (β)	T-count	Sig. (p-value)	Information
Digital Entrepreneurship Course	0.419	5.462	0.000	Significant (H1 accepted)
Students Motivation	0.578	7.638	0.000	Significant (H2 accepted)

In Table 3, the p-value <0.05 indicates that both independent variables partially and significantly affect the fostering of green entrepreneurial spirit. Entrepreneurship courses partially and significantly affect the fostering of green entrepreneurial spirit. Motivation partially and significantly affects the fostering of green entrepreneurial spirit. The β value shows the direction and magnitude of the influence. Student motivation has a more decisive influence than entrepreneurship courses.

3.1.3. Results of Simultaneous Data Analysis

Simultaneous data analysis was conducted to test the influence of digital entrepreneurship course variables and student motivation on fostering a green entrepreneurial spirit. This test uses the F-test to determine the significance of the combined influence of the two independent variables on the dependent variable. The results of the analysis can be seen in Table 4 below.

Table 4. Results of Simultaneous Analysis by Green Entrepreneurial Spirit as Dependent Variable

Independent Variable	Coefficient of Determination (R^2)	F-count	Sig. (p-value)	Information
Digital Entrepreneurship and Course and Students Motivation	0.790	63.493	0.000	Significant (H3 accepted)

In Table 4, the F-count value = 63.493 is greater than the F-table, and the p-value <0.05 , so simultaneously, entrepreneurship courses and motivation significantly affect the fostering of green entrepreneurial spirit. The R^2 value of 0.790 means that entrepreneurship courses and student motivation variables can explain 79% of changes in the green entrepreneurial spirit. Other variables outside the model explain the remaining 32%.

3.2. Discussion

3.2.1. Students' Perceptions of Digital Entrepreneurship Courses

The study results showed that students' perceptions of the digital entrepreneurship course were generally positive. Most students considered this course relevant to the times' needs because it provided an understanding of technology-based entrepreneurship and introduced various digital platforms for business development. Students also felt that the material presented was applicable and encouraged them to think creatively and innovatively when designing digital business ideas. In addition, interactive and project-based learning methods could increase student interest and involvement in the learning process. Thus, the digital entrepreneurship course is considered important and contributes to forming an adaptive entrepreneurial mindset to technological developments.

Entrepreneurship education is a strategic step that aims to instill the spirit and drive to be an entrepreneur in students as the nation's next generation (Ahmad et al., 2023). Entrepreneurship equips students with the skills and readiness to face various challenges and changes in the business world in the future. Implementing entrepreneurship courses in universities is a form of real support in introducing the values of sustainability through a green entrepreneurship approach. Also, it encourages the growth of students' intentions to become entrepreneurs.

These perceptions are aligned with previous research highlighting the importance of integrating digital competencies into entrepreneurship education to prepare students for the evolving demands of the digital economy (Jardim, 2021; Samerkhanova et al., 2022; Sitaridis & Kitsios, 2024). The relevance of the course content, especially its focus on technology-based business models and digital platforms, resonates with students' expectations of modern entrepreneurial education. Furthermore, using interactive, project-based

learning methods aligns with experiential learning theory, which emphasizes learning through experience to enhance creativity and innovation (Blankesteijn et al., 2024; Saifi et al., 2024). These methods enhance student engagement and foster critical thinking and adaptability, skills essential in navigating the digital entrepreneurial landscape.

3.2.2. Impact of Digital Entrepreneurship Courses to Green Entrepreneurial Spirit

The study confirms that digital entrepreneurship courses significantly contribute to fostering of green entrepreneurial spirit in students. This supports existing literature that underscores the potential of entrepreneurship education to instill sustainability values (Suguna et al., 2024; Zahrani, 2022). This course focuses on developing business ideas and instills the values of sustainability, environmental awareness, and social responsibility in entrepreneurial practices. Students taking entrepreneurship courses tend to be more aware of the importance of creating environmentally friendly businesses and oriented toward a sustainable future. Materials on green entrepreneurship, sustainable business case studies, and project-based assignments that carry environmental issues also encourage students to integrate green principles into every business idea they develop. Thus, entrepreneurship courses play an important role in forming entrepreneurial characters who are innovative and responsible for the environment.

The inclusion of case studies on sustainable businesses, environmental-themed assignments, and discussions on green innovation encourage students to integrate ecological considerations into their business thinking. This reflects a pedagogical shift toward embedding the United Nations' Sustainable Development Goals (SDGs) into higher education curricula (Collier et al., 2022; Li et al., 2023; Makuya & Changalima, 2024). By presenting sustainability not just as a moral imperative but as an entrepreneurial opportunity, students are more likely to perceive green entrepreneurship as both viable and desirable.

3.2.3. Impact of Motivation to Green Entrepreneurial Spirit

The study results showed that motivation significantly influenced the fostering of green entrepreneurial spirit in students. Motivation, particularly intrinsic motivation, was found to be a strong predictor of students' inclination toward green entrepreneurship. This finding is consistent with Self-Determination Theory, which posits that autonomy, competence, and relatedness foster intrinsic motivation and lead to more sustained engagement (Chiu, 2021; Luo et al., 2021). Supported by Faiza et al. (2024), found that one of the factors causing the success of digital entrepreneurship courses by 39% was motivation.

Students with a strong internal drive, such as the desire to create positive environmental changes, tend to be more interested in developing business ideas oriented towards sustainability. According to Bahri & Hasdiansa (2024), and Wang et al. (2021), motivational factors such as concern for environmental issues, the desire to contribute to society, and the aspiration to build a business with a positive ecological impact are the main drivers of the emergence of a green entrepreneurial spirit. In addition, motivation that is fostered through a supportive and inspiring learning environment (Islam & Ali Khan, 2024; Ripollés & Blesa, 2024) also strengthens students' determination to design and run an environmentally friendly business (Anghel & Anghel, 2022; Qazi et al., 2021). These findings indicate that the higher the level of student motivation, the greater their potential to foster a green entrepreneurial spirit aware of social and environmental responsibility.

3.2.4. Impact of Digital Entrepreneurship Courses and Motivation to Green Entrepreneurial Spirit

The study results show that simultaneously, entrepreneurship courses and motivation significantly influence the fostering of green entrepreneurial spirit in students. The combination of structured learning about the concept of sustainable entrepreneurship and students' internal drive to innovate in an environmentally friendly manner has been proven to form entrepreneurial characters who care about environmental and social issues. Digital entrepreneurship education and student motivation create a synergistic effect that amplifies the development of green entrepreneurial spirit.

Supported by Anghel & Anghel (2022), and Uvarova et al. (2021), entrepreneurship courses provide theoretical and practical foundations that introduce students to green entrepreneurship. At the same time, motivation is the driving force that drives students to apply this knowledge in designing and developing business ideas that are oriented toward sustainability (Reuther et al., 2023; Waris et al., 2022). The synergy between these two factors strengthens students' awareness of the importance of creating business solutions that are economically profitable and responsible for the environment and society. This dual influence reflects the theory of planned behavior, where attitudes (formed through education) and perceived behavioral control (enhanced by motivation) together shape entrepreneurial intentions (Lv et al., 2021; Su et al., 2021; Tseng et al., 2022). The results suggest that universities should adopt a holistic approach that combines curricular content with strategies to boost student motivation, such as mentorship, role models, and experiential learning opportunities.

3.3.5. Implications of Integrating Digital Entrepreneurship and Green Values in Higher Education

Integrating digital entrepreneurship and green values in higher education has strategic implications in producing a generation of entrepreneurs who are not only adaptive to technological developments but also have high environmental awareness. This approach encourages educational institutions to design a curriculum that emphasizes the ability to do business in the digital realm and instills the principles of social and ecological responsibility in every aspect of learning. Through this integration, students are encouraged to develop technology-based business solutions that are innovative, efficient, and environmentally friendly. In addition, the values of green entrepreneurship introduced since college play an important role in forming a more sustainable, critical, and visionary mindset in facing global challenges such as climate change and resource crises. Higher education can be a driving force in creating a digital, sustainable, and future-oriented entrepreneurial ecosystem. This study offers novelty by demonstrating how the integration of sustainability principles within digital entrepreneurship education concretely fosters green entrepreneurial spirit, reflecting a pedagogical shift toward curricula aligned with the Sustainable Development Goals (SDGs).

4. CONCLUSION

This study underscores the significant impact of digital entrepreneurship courses and student motivation in fostering a green entrepreneurial spirit in students' perceptions. Digital entrepreneurship and green entrepreneurship education are very important in preparing students to face future business challenges. By combining digital skills and environmental awareness, students can be trained to create profitable and beneficial businesses for the earth. High motivation to become entrepreneurs, fueled by an understanding of the positive impacts that can be provided through sustainable businesses, will further strengthen the spirit of green entrepreneurship among students. This will pave the way for a future generation of entrepreneurs skilled in technology and responsible for the environment and society. This study offers novelty by demonstrating how the integration of sustainability principles within digital entrepreneurship education concretely fosters a green entrepreneurial spirit, reflecting a pedagogical shift toward curricula aligned with the Sustainable Development Goals (SDGs). In conclusion, integrating digital and green entrepreneurship education, supported by student motivation, holds strategic potential in shaping a new generation of entrepreneurs who are both technologically proficient and socially responsible entrepreneurs.

The implications and contributions of this study prove that instilling sustainability values in digital entrepreneurship education is a strategic approach to fostering environmentally responsible entrepreneurship in the digital era. Integrating digital entrepreneurship courses and strong motivation significantly shape students' perceptions of green entrepreneurial spirit, playing a crucial role in fostering a sustainable generation of entrepreneurs in the digital era. This study is limited to students' perceptions. Future research should explore lecturers' perceptions and the combined perceptions of both students and lecturers. It is expected that incorporating the perspectives of all teaching components will provide a more comprehensive understanding of the research topic.

ACKNOWLEDGMENTS

The authors would like to thank all participants who supported this research.

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