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Generative artificial intelligence (ChatGPT) technology and its impact on the development of digital entrepreneurship skills among university students

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Abstract

This research aimed to study the impact of generative AI technology, specifically ChatGPT, on the development of digital entrepreneurship skills among university students. It explores how AI technologies can be integrated into higher education to develop core digital entrepreneurship skills, including innovation, creative thinking, and entrepreneurial initiative. A quasi-experimental design was employed, involving two groups of graduate students from the College of Education at King Khalid University. The experimental group was exposed to generative AI platforms (ChatGPT), while the control group was trained using traditional educational methods. To measure the impact, assessment tools, such as the Digital Entrepreneurship Scale and the Entrepreneurial Product Scorecard, were used before and after the intervention. The results indicated significant positive differences in favor of the group that used ChatGPT, demonstrating improved digital entrepreneurship skills and the ability to create pioneering digital products. Generative AI technologies provided a conducive environment for students to systematically organize their ideas, generate innovative solutions, and effectively analyze data. This research demonstrates that the integration of generative AI platforms, such as ChatGPT, into university curricula has a positive impact on the development of digital entrepreneurship skills. These technologies also enhance students' entrepreneurial mindset and innovative capabilities, helping to bridge the gap between academic learning and the practical requirements of the digital job market. Educational institutions should therefore integrate generative AI into their curricula and provide comprehensive training for faculty and students to maximize the benefits of these technologies. In doing so, universities can better prepare students for dynamic professional environments and foster sustainable and innovative digital entrepreneurship initiatives.

Keywords: Digital entrepreneurship, e-platforms, Generative AI.

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1. Introduction

Generative AI technology is based on helping the learner and teacher to obtain, generate, produce, and share fast, interactive scientific content, which can be built, modified, or adapted by the teacher or learner to support participation, interaction, and immersion in the learning process.

AI-driven educational platforms track student behavior, support at-risk students, and analyze learning challenges. Unlike traditional assessment methods, AI identifies whether difficulties stem from conceptual gaps or question ambiguity, pinpointing missed steps and guiding students toward the correct approach (Musa and Bilal [1]). A study by Fryer et al. [2] explored the impact of AI-powered chatbots in language learning, showing their effectiveness in text-to-speech activities and feedback. Through OpenAI's ChatGPT, students can organize their thoughts, generate creative ideas, and enhance their innovation and entrepreneurship skills. They can collaborate with teachers to analyze AI-generated insights, fostering deep discussions that drive entrepreneurial ideas. Additionally, ChatGPT aids in writing articles, designing presentations, creating visuals, and developing e-lessons, making it a valuable tool for preparing individuals for future careers.

In this regard, the study by Halaweh [3] concluded that the ChatGPT platform can be used to evaluate the credibility of learning and develop critical and creative thinking skills by having the teacher create content for a specific topic. Then, the students evaluate the information contained in it and verify its accuracy. It can also be used to improve students' writing and generate new ideas and information. Artificial intelligence (AI) is a transformative technology that institutions cannot afford to ignore. Global leaders recognize its vast potential, with the U.S. prioritizing AI research to drive advancements in education, science, and medicine. Similarly, China aims to become a global AI leader by 2030 through an ambitious national strategy [4].

With the advancement of the Internet and artificial intelligence platforms in recent years, a new category has emerged in the field of entrepreneurship known as digital entrepreneurship, which is a social, economic, and technological phenomenon based on digitizing operations and focusing on benefiting from new digital technologies in smart ways such as artificial intelligence platforms, smartphone applications, cloud computing, etc. Its goal is to change the traditional methods followed in most institutions to establish and practice businesses in the digital age [5].

Florin et al. [6] identified digital entrepreneurship skills that distinguish an entrepreneur from others in five dimensions: proactive action, preference for innovation, self-efficacy, achievement motivation, and non-conformity. These skills raise the entrepreneurial motivation of the individual so that they proactively seek opportunities and respond to challenges, obstacles, and tasks in an innovative way. Therefore, many countries have moved towards adopting entrepreneurial education in their educational systems, in order to raise their generations on entrepreneurship as the main driver of economic and social development. In the United States of America, a week has been allocated every year for individuals to practice entrepreneurial work, in addition to the advanced educational programs offered by universities in the field of digital entrepreneurship. In Japan, universities have been given independence in developing and leading, and reducing the gap between educational outcomes and labor market needs, Al-Hana'i and Shahat [7]. Ayoub [8] found that students produce few entrepreneurial ideas due to an overemphasis on academics over practical problem-solving. Al-Rumaidi [9] also revealed weak university support for digital entrepreneurship, lacking strategies to motivate creative students or integrate entrepreneurship into its vision and mission.

Several studies have shown that ChatGPT enhances adaptive learning, critical thinking, and data analysis skills [10], but most research has focused on general academic learning and has not sufficiently addressed the role of this technology in developing digital entrepreneurial skills among students. While Al-Mughairi and Bhaskar [11] indicate that the use of ChatGPT in education still faces challenges in linking it to applied skills associated with digital entrepreneurship, making this area in need of further exploration. Although some studies have addressed the use of artificial intelligence to support decision-making and innovation [2], few have focused on how ChatGPT can actually contribute to developing digital entrepreneurial thinking and motivating students to implement entrepreneurial projects based on artificial intelligence. There is still a gap in measuring the actual impact of these technologies on entrepreneurial initiatives among university students, especially in different educational environments.

From the above, it is clear that designing entrepreneurial projects and ideas is a necessary condition for the success of an educational institution, especially in light of the tremendous technological development in this era. As for negativity and superficial understanding of information, as well as the weakness in producing digital entrepreneurial ideas and projects that play a major role in serving the individual and society, being satisfied with merely browsing websites, listening to lectures, taking notes, and saving them for the final exam is considered superficiality and a hindrance to creativity, innovation, and leadership among university students in the era of the Fourth Industrial Revolution.

2. Research Problem

The technological revolution has transformed various life fields, with education benefiting the most. Traditional memorization-based methods are being replaced by AI-driven approaches that foster self-learning, creativity, and innovation. These advancements enrich students' learning experiences, preparing them for a digital future beyond traditional teaching [12]. The study of Ahmed and Wahbi [13] was interested in examining the difficulties that graduates of Arab universities suffer from when integrating into the labor market. The study concluded that the current labor market and its future prospects do not accommodate the outputs of higher education institutions; This is due to the lack of compatibility of the outputs of these institutions in terms of quantity and quality with the labor market, as universities are concerned with filling minds with extensive knowledge and information, and neglecting the skills that aim to develop innovation and leadership.

The number of those who possess digital entrepreneurship skills in Arab higher education institutions is small as Arab university institutions are still unable to build new generations of technological innovators who lead the development process

in Arab national economies Al-Rumaidi [9]. Al-Mughairi and Bhaskar [11] confirms this, as university education institutions do not provide the necessary flexibility to nurture talent, creativity, and digital innovation, and they have a major deficiency in providing a creative educational environment for students, and the traditional educational model is one of the most prominent obstacles to creativity and innovation. In this regard, Kandlhofer and Steinbauer [12] indicate that Arab universities do not care much about the field of digital entrepreneurship for businesses, but rather focus on knowledge related to test performance only or the culture of deposit, not creativity and innovation.

Fryer et al. [2] confirm that most technological products only work to convert traditional content into a digital format; as a result, learners believe that they have the ability to create and innovate, but in reality, they have only known little. Al-Shami [14] pointed out that there are many obstacles to innovation and digital leadership, the most prominent of which are: the lack of interest in emerging, modern, and exciting technologies that open a wide field for technological innovation, such as: artificial intelligence, robotics, big data analysis, the Internet of Things, and others. Although there are many studies discussing the potential of generative AI to improve the educational process [15], there is a clear lack of research on how to effectively integrate ChatGPT into digital entrepreneurship curricula. Omar [16] indicates that there is an urgent need to design interactive educational models based on generative AI, indicating the absence of clear strategies to achieve this integration in a systematic and thoughtful manner.

Creativity and decision-making are essential skills for entrepreneurship, but how ChatGPT directly affects these skills has not yet been analyzed. According to Halaweh [3] relying on AI to create content and develop ideas may have different effects on students' creative thinking abilities, which requires further empirical studies to measure this effect in the context of digital entrepreneurship.

It is clear from the above that there is a lack of studies that explore the direct impact of generative AI technologies, such as ChatGPT, on the development of digital entrepreneurship skills among university students. Despite the studies that have addressed the benefits of AI in the educational process, there is still a need to conduct experimental research that measures the effectiveness of ChatGPT in developing entrepreneurial thinking, enhancing digital innovation, and improving the decision-making process among university students. There is also a need to develop an integrated methodological framework that helps universities effectively integrate generative AI technology into digital entrepreneurship curricula.

From the above, the problem of the current research was identified as the weakness of digital entrepreneurship skills among university students; therefore, the current research seeks to address this weakness by using modern AI platforms and applications to develop their digital entrepreneurship skills.

3. Research Questions

The current research attempted to answer the following questions:

- 1- What is the impact of using ChatGPT generative artificial intelligence technology on developing digital entrepreneurship skills among university students?
- 2- What is the impact of using ChatGPT generative artificial intelligence technology on producing pioneering digital content among university students?

4. Research Hypotheses

The current research attempted to verify the validity of the following hypotheses:

- 1- There is no statistically significant difference at the level (0.05) between the average ranks of the first experimental group (which used artificial intelligence platforms) and the second experimental group that used usual software in the post-application of the digital entrepreneurship scale among university students.
- 2- There is no statistically significant difference at the level (0.05) between the average ranks of the first experimental group (which used artificial intelligence platforms) and the second experimental group that used usual software in the post-application of the pioneering digital product evaluation card among university students.

5. Research Objective

The current research aims to develop digital entrepreneurship skills among graduate students at the College of Education through the use of modern generative artificial intelligence platforms and applications.

6. Importance of the Research

- 1- Directing the attention of university education officials to the need to focus on employing artificial intelligence applications in the field of university education.
- 2- Providing a smart training environment based on modern artificial intelligence platforms, which can benefit graduate students in developing their deep understanding of academic courses, as well as producing pioneering digital works that can benefit society.
- 3- Encouraging students to design and produce pioneering projects and ideas that can contribute to developing society and achieving sustainable development.

7. Research limitations

The current research was limited to the following limitations:

- 1- Applications and platforms of generative artificial intelligence.
- 2- Course "Computers in Education - 6000 Tech-2".

3- Digital entrepreneurship skills: proactive skills, innovative skills, motivation to achieve, self-efficacy, and nonconformity.

8. Method and Procedures

The current research used the quasi-experimental approach based on the two-group design with pre- and post-application of performance measures.

9. Research Procedures

To identify the effectiveness of artificial intelligence platforms in developing digital entrepreneurship skills among graduate students at the College of Education, King Khalid University, the following was done:

First, selecting the research sample:

The research sample was selected from the "graduate" students at the College of Education, King Khalid University, in a random manner, represented in two groups: the first experimental group, consisting of 17 students, was trained through artificial intelligence platforms, while the second experimental group, consisting of 18 students, was trained in the usual way at the university through the Blackboard platform available at the university. To ensure the equivalence of the two groups, the research tools were applied prior to the application, and the results were as shown in Table 1.

Table 1.
Mann-Whitney test results for the digital entrepreneurship scale in pre-application.

The Tool	Number	Group	Average rank	Total ranks	U	Z	Sig level	Sig
1. Digital Entrepreneurship Scale	2. 17	3. First	15.85	269.50	116.50	-1.233	0.217	Not significant
	4. 18	5. Second	20.03	360.50				

Table 1 shows that the calculated value of (z) (-1.233) in the digital entrepreneurship scale is not significant at a significance level of (0.05), which indicates that there is no statistically significant difference between the two groups in the pre-application of the digital entrepreneurship scale, which indicates the homogeneity of the two groups.

Second: Preparing research materials:

1- Designing a learning environment based on artificial intelligence platforms:

To design a learning environment based on artificial intelligence platforms, some previous studies were reviewed, such as: the study [17] and the general ADDIE design model was followed as follows:

First stage: Analysis:

In this stage, the following procedures were carried out:

- Determining the general objectives of the learning environment based on artificial intelligence platforms, where the general objective of this environment is to develop digital entrepreneurship skills.
- Determining the characteristics of learners: Graduate students at the College of Education, King Khalid University, belong to one environment with similar conditions
- Educational material: The training content was determined in the form of 5 training units.

The second stage: Design stage:

The design stage includes defining the procedural objectives of the learning environment based on artificial intelligence platforms, developing a comprehensive vision of the content, learning strategy, various activities appropriate for it, and evaluation methods, as follows:

A- Procedural objectives of the learning environment based on artificial intelligence platforms:

Topic One: Computer Software:

Topic Two: Computer Uses:

Topic Three: Electronic Mind Maps:

Topic Four: The Internet and Education:

Topic Five: E-Learning:

B- Content of the learning environment:

The content of the learning environment based on artificial intelligence platforms included the following topics:

Topic One: Computer Software

Topic Two: Computer Uses

Topic Three: Electronic Mind Maps

Topic Four: The Internet and Education

Topic Five: E-Learning

C- Learning Strategy and Activities Followed in Artificial Intelligence Platforms:

In light of the procedural objectives and the content of the learning environment, the learning strategy using artificial intelligence platforms proceeded according to the following flowchart:

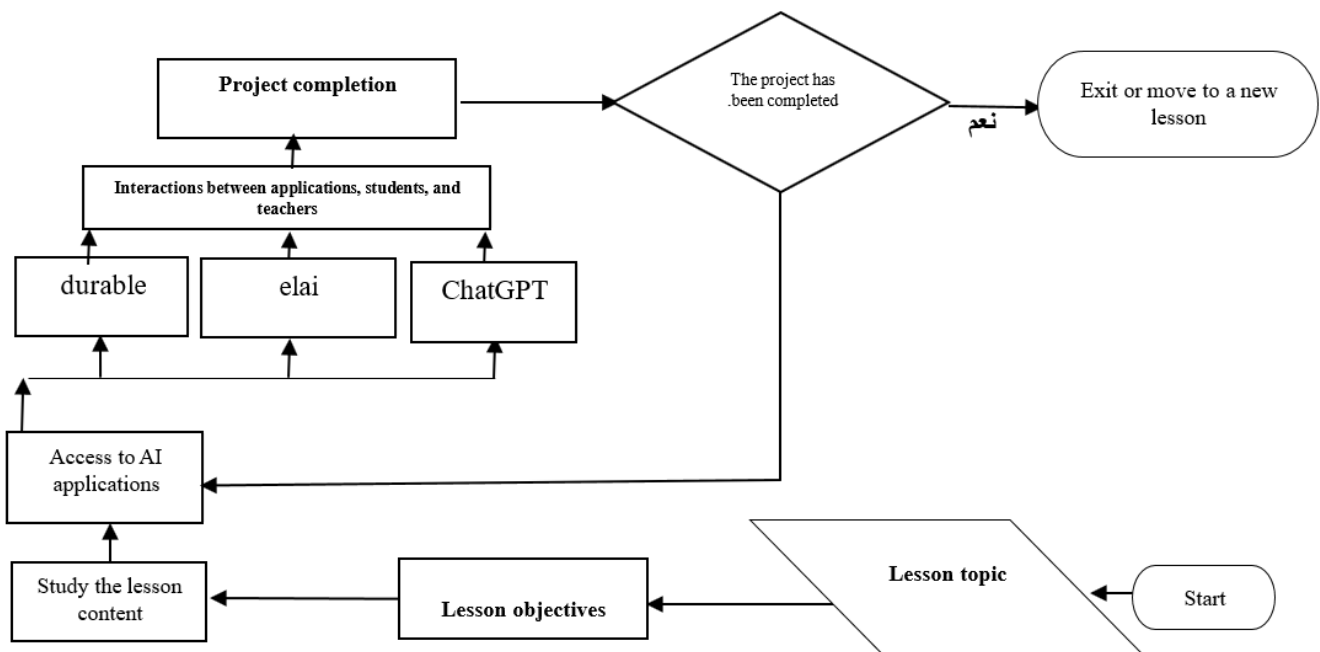


Figure 1.
Flow chart of the learning strategy via artificial intelligence platforms.

D- Evaluation methods:

The evaluation methods varied to include pre-evaluation at the beginning of each topic to assess previous learning, formative evaluation during each content to guide student learning and provide feedback, and final evaluation, which is done after completing the study of all training content designed according to artificial intelligence platforms, to assess the development of digital entrepreneurship skill levels among the research sample.

Stage Three: Development Stage:

Use some of the following AI platforms at this stage:

- <https://elai.io/> (to design a professional video)
- <https://tome.app/> (to design professional presentations)
- <https://whimsical.com/> (design electronic mind maps)
- www.d-id.com (convert images to a professional video)
- <https://durable.co/> (design a professional website)
- <https://www.tutorai.me/> (design and create an educational lesson)

Stage Four: Implementation Stage:

In this stage, the electronic content was applied to artificial intelligence platforms for 50 users, and how to access these platforms and the tasks required to be performed were explained.

Stage Five: Evaluation Stage:

In this stage, measurement tools were applied, represented by the digital entrepreneurship scale and a product evaluation card, after studying all the training content for the students of the research sample.

Third: Preparing performance measures:

9.1. Digital Entrepreneurship Scale

The scale aimed to measure the digital entrepreneurship skills of graduate students at the College of Education, King Khalid University, after reviewing a number of studies, such as the study of Ayoub [8] and the study of Al-Hana'i and Shahat [7]. The dimensions of this scale were reached, which were represented in five dimensions: proactive behavior, preference for innovation, self-efficacy, achievement motivation, and non-conformity. After presenting the scale to a group of arbitrators and testing it exploratorily on 14 students using the Cronbach's Alpha equation, it was found to be approximately equal to 0.79, which is an appropriate stability coefficient.

9.2. Preparing A Product Evaluation Card

The card aimed to evaluate the pioneering digital product designed by graduate students at the College of Education, King Khalid University, in the course "Computers in Education." After presenting the card to a group of arbitrators and testing it in a pilot experiment on ten graduate students at the College of Education, King Khalid University, the card's stability was calculated using the "Cooper" equation, and it was found to be approximately equal to 0.92, which is an appropriate percentage for the card's stability.

9.3. Research Results and Discussion

After monitoring the students' grades in the post-application in each of the digital entrepreneurship scale, and a product evaluation card in the "Computers in Education" course, the research questions were answered as follows:

1- Answering the first question, which stated: What is the effect of using ChatGPT generative artificial intelligence technology on developing digital entrepreneurship skills among university students? To answer this question, the following hypothesis was formulated: There is no statistically significant difference at the (0.05) level between the average scores of the first experimental group and the second experimental group in the post-application of the digital entrepreneurship scale among university students.

To test the validity of this hypothesis, statistical processing was carried out using the (Mann–Whitney U test) for two independent samples to compare the ranks of the scores of the digital entrepreneurship scale application for the first experimental group and the other experimental group. Table 2 shows the results of applying the "U" test to indicate the differences between the ranks of the first experimental group and the other experimental group in the entrepreneurship scale.

Table 2.

Results of the Mann-Whitney test on the digital entrepreneurship scale in the post-application.

The tool	Number	Group	Average rank	Total ranks	U	Z	Sig level	Sig
6. Digital Entrepreneurship Scale	7. 17	8. First	00.27	459.00	0.00	-5.069**	0.001	Significant
	9. 18	10. Second	9.50	171.00				

Table 2 shows that the calculated value of (z) (-5.069) in the digital entrepreneurship scale is significant at a significance level of (0.05), which indicates the existence of a statistically significant difference between the two groups in the post-application of the digital entrepreneurship scale in favor of the average of the higher ranks, i.e., in favor of the first experimental group that used artificial intelligence platforms. Thus, the first hypothesis of the research hypotheses was rejected as there is a statistically significant difference at a level of (0.05) between the average ranks of the first experimental group (that used artificial intelligence platforms) and the second experimental group that used (the usual software) in the post-application of the digital entrepreneurship scale in favor of the first experimental group. This previous result can be attributed to the following:

The main feature of artificial intelligence platforms is the fluency of ideas and their exchange with others. Through artificial intelligence platforms with big data, there was openness to the ideas of others and benefiting from them in exchanging ideas and learning about what is new in the field of "computers." This contributed to the development of digital fluency and innovation skills among graduate students. Artificial intelligence platforms include tools that help students freely edit content, whether by adding or deleting, and then verifying the new content through artificial intelligence platforms. These platforms then helped to diversify computer ideas with complete freedom.

Artificial intelligence platforms are characterized by presenting many other ideas about the research topic, and sharing that with others, or asking the smart platform about these ideas. Then artificial intelligence platforms help to present many pioneering ideas, which may have contributed to the development of digital entrepreneurship skills among the research sample. Artificial intelligence platforms are characterized by students receiving immediate feedback and then obtaining correct and diverse scientific content, which led to increased motivation to learn, which helped develop digital entrepreneurship skills among the research sample.

Artificial intelligence platforms are characterized by providing freedom and flexibility for students to perform the required tasks and activities easily. The ease of dealing with artificial intelligence platforms increased students' motivation to learn and thus developed innovative entrepreneurial tendencies in the "Computers in Education" course. Artificial intelligence platforms are characterized by their ability to evaluate and analyze students' different responses and then treat their weaknesses and enhance their strengths. These platforms are also characterized by diversifying sources of ideas and information, which led to the growth of students' intellectual fluency skills, and thus developed entrepreneurial digital skills in the "Computers in Education" course.

Answering the second question, which stated: What is the effect of using ChatGPT generative artificial intelligence technology on the production of pioneering digital content among university students? To answer this question, the following hypothesis was formulated: There is no statistically significant difference at the level (0.05) between the ranks of the scores of the first experimental group and the second experimental group in the post-application of a pioneering digital product evaluation card among university students.

To test the validity of this hypothesis, statistical processing was carried out using the (Mann–Whitney U test) for two independent samples to compare the ranks of the scores of the application of a pioneering digital product evaluation card for the first and other experimental groups. Table 3 shows the results of applying the "U" test to indicate the differences between the ranks of the first experimental group and the other experimental group in the product evaluation card.

Table 3.

Results of the "Mann-Whitney" test in the pioneering digital product evaluation card in the post-application.

The tool	Number	Group	Average rank	Total ranks	U	Z	Sig level	Sig
11. Digital Entrepreneurship Scale	12. 17	13. First	24.06	409.00	50.00	-4.429**	0.001	Significant
	14. 18	15. Second	12.28	221.00				

Table 3 shows that the calculated value of (z), (-4.429) in the digital product evaluation card, is significant at a significance level of (0.05), which indicates the existence of a statistically significant difference between the two groups in the post-application of the digital product evaluation card in favor of the average of the higher ranks, i.e., in favor of the first experimental group.

Thus, the second hypothesis of the research was rejected, as there is a statistically significant difference at a level of 0.05 between the average ranks of the first experimental group (which used artificial intelligence platforms) and the second experimental group (which used the usual software) in the post-application of the digital product evaluation card, in favor of the first experimental group.

This previous result can be attributed to the following:

- Artificial intelligence platforms include easy-to-use tools with a high degree of accuracy and design, which have helped produce pioneering digital products for graduate students.
- Artificial intelligence platforms include digital assistants as well as tools to respond to any inquiry from the learner, and thus help to complete digital work quickly and accurately.
- Artificial intelligence platforms work through deep learning technologies, and these technologies and platforms have helped solve difficult problems for the learner and simplify any obstacle he faces.
- Artificial intelligence platforms also provide customized education for each student according to their needs and abilities, so students are able to work with these platforms without any pressure, which helps hone students' skills and then produce pioneering digital works in the field of computers.

11. Scientific and Practical Significance of the Research Results

- Through Tables 2, 3, the researchers explain the practical or applied importance of the research results by finding the size of the impact of the independent variable on the dependent variables.

Table 4.
practical significance of the research results.

Independent variable	Independent variable	(Z)	Eta square η^2	Effect size
AI platforms	Digital Entrepreneurship	-5.069	0.76	Big

- It is clear from Table 4 that the size of the impact of artificial intelligence platforms on digital entrepreneurship is (0.76), which is a large percentage, and in the field of producing pioneering digital products.

12. Conclusion

Recent decades have witnessed a radical transformation in the educational landscape due to the rapid development of generative artificial intelligence technologies, which have led to the emergence of new tools such as ChatGPT that provide unprecedented capabilities to enhance digital learning environments. This research aimed to study the impact of using ChatGPT in developing digital entrepreneurship skills among university students, as it has been shown that integrating artificial intelligence technologies into higher education contributes to developing entrepreneurial thinking, enhancing innovation, and motivating students to produce more advanced and sustainable pioneering digital content.

The research results showed that relying on generative artificial intelligence platforms enhances students' ability to organize their ideas, explore innovative solutions, and make informed decisions in a digital entrepreneurship environment. The use of ChatGPT also helped bridge the gap between educational curricula and the requirements of the digital labor market, as it provided students with advanced tools that enable them to implement entrepreneurial projects based on artificial intelligence, giving them a competitive advantage in advanced professional environments. Despite the clear benefits demonstrated by the research, the success of integrating generative artificial intelligence into education depends on the readiness of educational institutions to provide adequate technical and academic support and to train students and faculty members on the optimal use of these technologies.

Despite the many positives demonstrated by the study, there are challenges that require further research and analysis. The most prominent of these challenges is the lack of technical proficiency among some faculty members, which affects the effectiveness of implementing educational programs based on artificial intelligence.

Based on these results, the research recommends the need to restructure educational curricula to include generative artificial intelligence tools as one of the essential components in developing digital entrepreneurship skills. Intensive training programs should also be designed for faculty members and students to ensure the effective use of these technologies, with a focus on developing interactive educational models that stimulate innovation and creativity. Moreover, more comprehensive future studies are needed to measure the impact of generative artificial intelligence on the academic and professional performance of students in various disciplines.

Finally, this research reflects the importance of adopting modern strategies to integrate generative artificial intelligence technologies into higher education, as ChatGPT and other artificial intelligence tools represent an opportunity to redefine traditional teaching methods and provide a more dynamic educational model that adapts to future variables. By enhancing the integration between technology and education, academic institutions can enable students to acquire the skills needed to succeed in the digital labor market and support innovation in the fields of digital entrepreneurship, which contributes to achieving sustainable development based on knowledge and modern technology.

References

- [1] A. Musa and A. H. Bilal, *Artificial intelligence: A revolution in modern technologies*. Jordan: Arab Group for Training and Publishing, 2019.
- [2] L. K. Fryer, K. Nakao, and A. Thompson, "Chatbot learning partners: Connecting learning experiences, interest and competence," *Computers in Human Behavior*, vol. 93, pp. 279-289, 2019. <https://doi.org/10.1016/j.chb.2018.12.023>
- [3] M. Halaweh, "ChatGPT in education: Strategies for responsible implementation," *Contemporary Educational Technology*, vol. 15, no. 2, p. ep421, 2023. <https://doi.org/10.30935/cedtech/13036>
- [4] B. Mar and M. Ward, *Artificial intelligence applications—How 50 successful companies used artificial intelligence and machine learning to solve problems* (A. Y. Haddad, Trans.). Saudi Arabia: Al-Obeikan Library, 2022.
- [5] A. A. R. Omar, *Introduction to modern entrepreneurship*. Saudi Arabia: Dar Al-Ebdaa Al-Thaqafi, 2022.
- [6] J. Florin, R. Karri, and N. Rossiter, "Fostering entrepreneurial drive in business education: An attitudinal approach," *Journal of Management Education*, vol. 31, no. 1, pp. 17-42, 2007. <https://doi.org/10.1177/1052562905282023>
- [7] Z. H. Al-Hana'i and M. A. Shahat, "Content analysis of the omani sixth grade science curriculum in light of the requirements developed by entrepreneurship skills," *Arab Journal of Education*, vol. 41, no. 1, pp. 291-332, 2022.
- [8] A. E.-D. A. H. Ayoub, "The effectiveness of a program based on practical intelligence in developing entrepreneurship skills and solving future problems among secondary school students," *Educational and Social Studies*, vol. 21, no. 3, pp. 299-366, 2015.
- [9] B. S. Al-Rumaidi, "Evaluating the role of Egyptian universities in developing the culture of entrepreneurship among students - A proposed strategy for improvement," *Journal of Economics of Finance and Business*, vol. 1, no. 6, pp. 372-397, 2018.
- [10] I. Adeshola and A. P. Adepoju, "The opportunities and challenges of ChatGPT in education," *Interactive Learning Environments*, vol. 32, no. 10, pp. 6159-6172, 2024. <https://doi.org/10.1080/10494820.2023.1234567>
- [11] H. Al-Mughairi and P. Bhaskar, "Exploring the factors affecting the adoption AI techniques in higher education: Insights from teachers' perspectives on ChatGPT," *Journal of Research in Innovative Teaching & Learning*, 2024. <https://doi.org/10.1108/JRIT-03-2024-5678>
- [12] M. Kandlhofer and G. Steinbauer, "Evaluating the impact of educational robotics on pupils' technical-and social-skills and science related attitudes," *Robotics and Autonomous Systems*, vol. 75, pp. 679-685, 2016. <https://doi.org/10.1016/j.robot.2015.09.007>
- [13] O. Ahmed and T. Wahbi, "Graduates of educational institutions and the labor market," *MENA Journal of Economic Studies*, vol. 2, no. 1, pp. 159-182, 2018.
- [14] G. S. Al-Shami, *Curriculum engineering and anticipating the future of technological innovation in the digital age*. Saudi Arabia: Al-Rushd Library, 2020.
- [15] M. Abdaljeleel *et al.*, "A multinational study on the factors influencing university students' attitudes and usage of ChatGPT," *Scientific Reports*, vol. 14, no. 1, p. 1983, 2024. <https://doi.org/10.1038/s41598-024-12345-6>
- [16] A. A. Omar, "The role of artificial intelligence in improving the quality of higher education," *International Journal of Qualitative Education*, vol. 4, no. 12, pp. 1-12, 2022.
- [17] M. M. Mansour, "The effect of different models of collaborative learning based on artificial intelligence through chatbot on the development of deep understanding skills and self-learning ability among professional diploma in education students," *International Journal of E-Learning*, vol. 4, no. 3, pp. 357-437, 2021.