Interdisciplinary Academic and Research Journal, 5 (6), November-December 2025
Old ISSN 2774-0374: New ISSN 2985-2749
Website: https://so03.tci-thaijo.org/index.php/IARJ/index

Artificial Intelligence in Art and Design Education and Challenges: An Exploration of Future Educational Models

Haitao Bai[1], Kumron Sirathanakul[2] and Kasinee Sokhuma[3]

[1] Ph.D. Student in Education Program, Faculty of Education, Shinawatra University, Thailand

[2,3] Faculty of Education, Shinawatra University, Thailand

Email: bht520@163.com, ORCID ID: https://orcid.org/0009-0002-8151-0354

E-mail: Kumron.b@siu.ac.th, ORCID ID: https://orcid.org/0009-0008-5800-7543

E-mail: sujin.b@siu.ac.th, ORCID ID: https://orcid.org/0009-0008-2618-0122

Received 10/03/2025 Revised 27/03/2025 Accepted 30/04/2025

Abstract

Background and Aims: The term "artificial intelligence" was first coined by John McCarthy at the Dartmouth Conference in 1956, marking the birth of artificial intelligence as an independent discipline. The discipline of AI is a highly integrated field of science and technology and philosophy, and despite its short history as a discipline, there is a long history of discussion about AI and that these philosophical theories were closely related to the formation of the concept of AI, similar to the way that the concept of "robot" was first introduced in literature and art. The study of the significance of artificial intelligence in art and design education can be elaborated in more detail at three levels: theoretical significance, practical significance, and educational practice.

Methodology: A core sample of 300 students from the Art and Design program classes of 2021 through 2023 was used for the study. The distribution of the student sample size was based on the following logic: 40% (120) freshmen, 35% (105) sophomores, and 25% (75) juniors. This ratio reflects both the comfort level of beginners with AI technology and the depth of senior students' experience with the technology.

Results: The study analyzes in detail the application of artificial intelligence in art and design education, including intelligent assisted teaching, stimulation of creative thinking, and accurate evaluation and feedback mechanisms. But also positively affected students' creativity. Nevertheless, the challenges of technology integration, ethical and moral considerations, and the reconfiguration of educational resources remain.

Conclusion: This study provides a new approach to supporting solid theory and practice for the reform and advancement of art and design education in the future. Although research in art and design is still in its infancy compared to information science, and also finds many common points between artificial intelligence and art and design, the research finds that exploring the impact of artificial intelligence on art and design education, and using the current widespread interest in artificial intelligence and its practical application as a starting point, provides theoretical and practical suggestions for future art design with clear implications for efficiency.

Keyword: Artificial Intelligence; Art and Design E; Technology

Citation: Bai, H., Sirathanakul, K., & Sokhuma, K. (2025). Artificial Intelligence in Art and Design Education and Challenges: An Exploration of Future Educational Models. Interdisciplinary Academic and Research Journal, 5(6), 647-656;
DOI: https://doi.org/10.60027/iarj.2025.286938

Interdisciplinary Academic and Research Journal, 5 (6), November-December 2025
Old ISSN 2774-0374: New ISSN 2985-2749
Website: https://so03.tci-thaijo.org/index.php/IARJ/index

Introduction

In the thousands of years of evolution of human civilization, (Chen et al, 2021) Changes in production tools and production methods have always been an important force driving social progress. (Satolo et al, 2020) From tool making in the Stone Age to land reclamation in the agricultural era, mankind has continuously promoted socio-economic development and cultural evolution by continuously improving production efficiency and optimizing resource allocation. (Flitton, et al 2022) In particular, since the modern era, mankind has ushered in three landmark industrial revolutions, which are mainly characterized by mechanization, electrification, and informationization, each of which has brought about far-reaching social changes. (Sharma & Singh, 2020) The first industrial revolution started with the textile industry in England in the 1860s, and through the widespread use of the steam engine, mankind entered the era of mechanized production. (Allen, 2017) By the mid-20th century, the rapid development of computer and Internet technologies gave birth to the third industrial revolution of Informationization. (Small,1994) At this stage, digital technology dramatically changed the way people work, the means of information dissemination, and the structure of society, laying the technological foundation of modern society. (Popkova, & Gulzat, 2020)

Currently, the world is ushering in a wave of the fourth industrial revolution, the core features of which are intelligence and interconnectivity. The rapid development of AI technology is considered to be the main driver of this wave. According to the McKinsey Institute, AI technology is expected to bring significant growth to the global economy over the next decade and become a key driver of productivity and technological innovation. (Bughin, et al, 2017)

The application of artificial intelligence technology in art and design education is a highly promising research direction. (He et al, 2019) As an important link in the cultivation of innovative talents (Jiao et al, 2020), the introduction of artificial intelligence technology has injected new vitality into this field. (Ertel,2024)

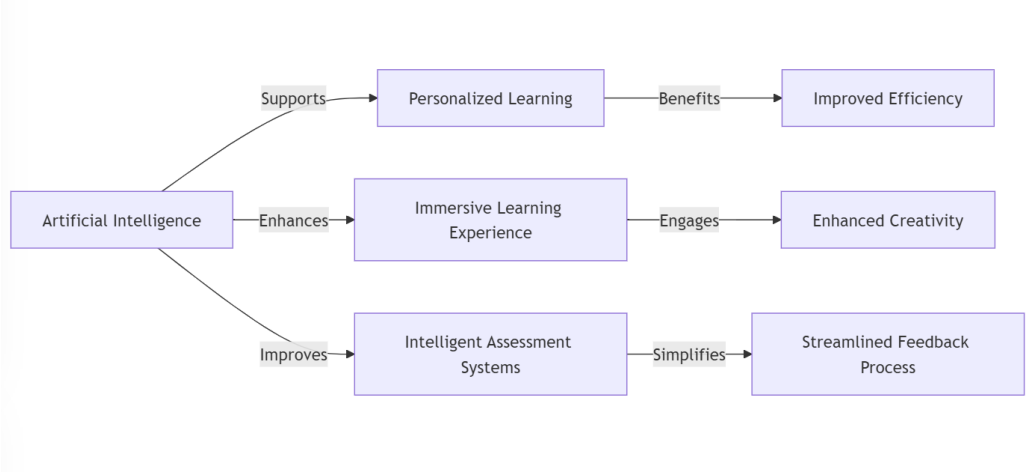

Figure 1 Framework of Artificial Intelligence Technology in Art and Design Education

Citation: Bai, H., Sirathanakul, K., & Sokhuma, K. (2025). Artificial Intelligence in Art and Design Education and Challenges: An Exploration of Future Educational Models. Interdisciplinary Academic and Research Journal, 5(6), 647-656;
DOI: https://doi.org/10.60027/iarj.2025.286938

In the future, with the further development of technology, the application scenarios of AI technology in art and design education will be more extensive and diverse. For example, through brain-computer interface technology, students may be able to directly transform their ideas into design solutions, and through higher-precision affective computing technology, AI may even be able to capture and understand the emotional state of students, thus further optimizing the learning experience. (Wooldridge, 2018)

To summarize, the research problem of this study is the advancement of artificial intelligence that affects the development of educational arts to create new forms of innovation, design, and challenges, exploring future educational models.

Purpose of the study

This study aims to comprehensively explore the application of AI technology in art and design education and its impact, providing new perspectives and empirical evidence for theoretical research and educational practice. The specific purposes of this study are as follows:

Literature Review

With the rapid development of artificial intelligence technology (Guo, Zheng,& Zhai, 2024), the field of education is undergoing unprecedented changes. From the traditional "teacher-led" teaching mode to the "technology-supported" mode (Gong, 2022), AI technology has redefined the implementation and effect of education through intelligent teaching support, data analysis, and personalized learning path design. In the field of art and design education, the introduction of AI not only provides strong technical support for traditional teaching but also opens a new chapter in the integration of art creation and technology. (Kim et al, 2022)

As a form of education that emphasizes the cultivation of creativity and practical ability, (Zhanqiang, 2023) Currently, the research and application of AI technology in the field of education mostly focuses on STEM (science, technology, engineering, and mathematics) education, and the research on art and design education is still in the preliminary stage. In particular, there is a lack of systematic research on the application scenarios of AI in art and design education, the method of technology implementation, and its specific impact on students' learning effects. Therefore, it is of great academic value and practical significance to explore how AI technology can optimize the teaching methods of art and design education, improve teaching efficiency, and enhance students' learning quality.

Citation: Bai, H., Sirathanakul, K., & Sokhuma, K. (2025). Artificial Intelligence in Art and Design Education and Challenges: An Exploration of Future Educational Models. Interdisciplinary Academic and Research Journal, 5(6), 647-656;
DOI: https://doi.org/10.60027/iarj.2025.286938

Research methodology

The innovation of teaching mode. However, the application of AI technology in education is also accompanied by many problems, such as adaptability, acceptability, and fairness. Therefore, it is particularly important to systematically explore the current situation, the influence mechanism, and the challenges faced by the application of AI technology in art and design education.

Concept of Framework

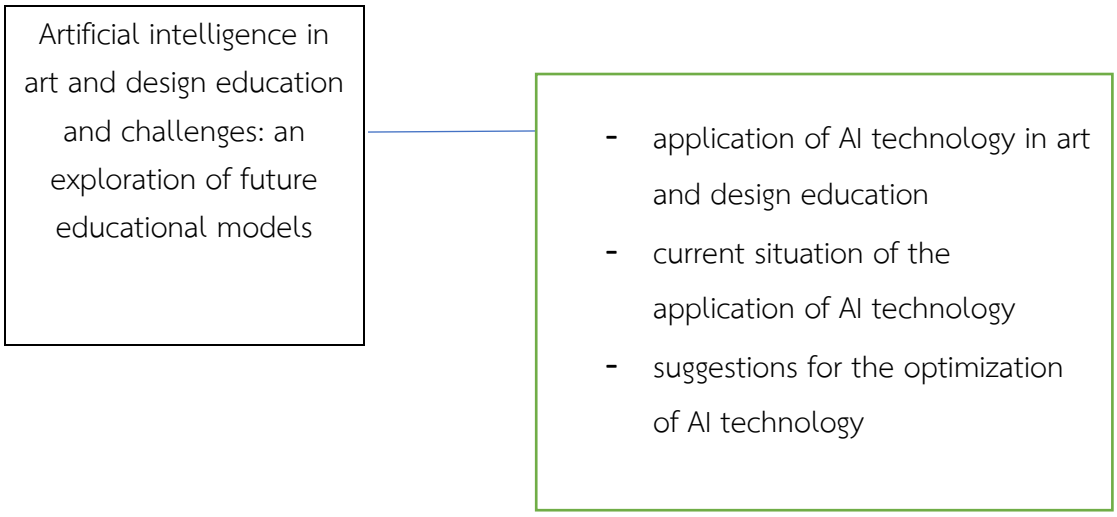

Figure 2 Concept of Framework

Logic of sample size selection

The study involved quantitative research by collecting questionnaires from the target group. A core sample of 300 students from the Art and Design program classes of 2021 through 2023 was used for the study. The distribution of the student sample size was based on the following logic: 40% (120) freshmen, 35% (105) sophomores, and 25% (75) juniors. This ratio reflects both the comfort level of beginners with AI technology and the depth of senior students' experience with the technology.

Teachers and Practitioners

The sample size of 30 teachers and practitioners is relatively small, but representative enough to provide professional feedback on the study from both teaching and practice perspectives. Teacher participants were required to have at least 3 years of teaching experience and have used at least one AI-assisted tool in their teaching, while practitioners were required to have practical project experience and have used AI-related design tools in their work.

Citation: Bai, H., Sirathanakul, K., & Sokhuma, K. (2025). Artificial Intelligence in Art and Design Education and Challenges: An Exploration of Future Educational Models. Interdisciplinary Academic and Research Journal, 5(6), 647-656;
DOI: https://doi.org/10.60027/iarj.2025.286938

Balance of sample size

The distribution of participants in each group was balanced to ensure the comparability of data analysis and the reliability of conclusions. For example, when exploring the impact of smart assessment tools on student learning outcomes, the sample sizes of the experimental and control groups were kept consistent to avoid analysis bias due to imbalance between groups.

Study Results

The excellent report "AI in Education: Impacts, Challenges and Opportunities for Sustainable Development" highlights the growing role of AI in education, the importance of AI research in education more than ever in recent years, and the preparation of pedagogical approaches to understanding, developing quality and inclusive data systems, ethics and transparency in data collection, employment and dissemination, and the relevance of dynamic policies for, presenting fundamental challenges for the sustainable growth of AI in education that meet international standards, including the development of comprehensive public policies on AI for sustainable development. Promoting the impact of AI in education has been emphasized elsewhere, and this applies not only to basic and secondary education but also to higher education and engineering, as discussed in the following subsections.

Discussion and Recommendations

The conflicting results of past research and the development principles of artificial intelligence that have occurred are new to humans. They have seen progress that will be made in using technology to create modernity in teaching and learning, but sometimes artificial intelligence may not be able to bring operations and use in teaching and learning in the future.

This centers on the application of AI technology in art and design education and systematically summarizes the main findings of the study in terms of conclusions, discussions, and recommendations. Firstly, a comprehensive overview of the research findings will be made to analyze and summarize the current situation of the application of AI technology, the effect of the improvement of teaching quality and learning efficiency, as well as the challenges faced in the application process. Subsequently, a conclusion-by-conclusion summary will be made around the research questions, and the theoretical significance and practical value of the research results will be further discussed in depth. Finally, suggestions for the optimization of AI technology and future educational research are put forward to provide insights into the application of technology and educational reform in the field of art and design education.

Summary of findings

Application Status of Artificial Intelligence Technology Personalized learning recommendation systems, intelligent assessment tools, and virtual reality technology have been gradually integrated into art and design education, mainly applied in the fields of resource recommendation, task feedback, and space design. About 60% of students and 40%

Citation: Bai, H., Sirathanakul, K., & Sokhuma, K. (2025). Artificial Intelligence in Art and Design Education and Challenges: An Exploration of Future Educational Models. Interdisciplinary Academic and Research Journal, 5(6), 647-656;
DOI: https://doi.org/10.60027/iarj.2025.286938

of teachers have contacted and used the relevant technologies, but the depth and breadth of their application are limited by the lack of equipment resources and technical support. Improvements in Teaching Quality and Learning Efficiency. The study showed that students using AI technology were more efficient in completing design tasks, and the quality of their work improved significantly. For example, students in the experimental group reduced task completion time by 25% and improved their design scores by 15% on average. Intelligent assessment tools and personalized recommendation systems significantly optimize the learning path through real-time feedback and dynamic resource adjustment.

Key Challenges to Technology Adoption: Inadequate technology adaptability, equipment shortages, uneven resource allocation, and lack of technology training are the main barriers to the diffusion of AI technology. Teachers and students generally demand improvements in the adaptability and ease of use of higher-order features of the technology. Teachers' and Students' Attitudes Teachers were positive about the AI technology's ability to enhance teaching efficiency and reduce workload, but showed reservations about the depth of assessment and personalized instruction for complex, creative tasks. Students, on the other hand, recognized the instant feedback and resource recommendation features, but suggested improvements to the learning curve and operational complexity of the technology.

Conclusions

Research Question 1: What is the current status of artificial intelligence in art and design education?

Artificial intelligence technology has been initially applied in art and design education, especially in the fields of personalized learning recommendation, intelligent assessment, and virtual reality technology, which have shown significant advantages. The personalized learning recommendation system can dynamically adjust resource recommendations according to students' learning behaviors, effectively reducing ineffective learning time; intelligent assessment tools support students to improve design tasks through multi-dimensional instant feedback. However, the application of virtual reality technology is still limited due to the high cost of equipment and lack of resources, especially in remote areas and economically underdeveloped schools.

1. The tension between technological adaptability and educational needs

The findings show that AI technology performs well in basic task assessment and resource recommendation, but has significant limitations in its ability to support higher-order design tasks. For example, emotional expression and abstract creativity tasks need to be combined with multidimensional data analysis, but existing intelligent assessment tools are more inclined to quantitative evaluation of technical indicators, and this one-dimensional assessment limits their application in complex creativity teaching.

Citation: Bai, H., Sirathanakul, K., & Sokhuma, K. (2025). Artificial Intelligence in Art and Design Education and Challenges: An Exploration of Future Educational Models. Interdisciplinary Academic and Research Journal, 5(6), 647-656;
DOI: https://doi.org/10.60027/iarj.2025.286938

Interdisciplinary Academic and Research Journal, 5 (6), November-December 2025
Old ISSN 2774-0374: New ISSN 2985-2749
Website: https://so03.tci-thaijo.org/index.php/IARJ/index

2. Uneven distribution of equipment and resources

The high cost of virtual reality equipment and unbalanced resource allocation have severely limited the scope of the technology's diffusion. Especially in less economically developed regions, schools can hardly afford the costs of equipment purchase and maintenance, resulting in teachers and students in these regions being unable to fully experience the pedagogical advantages of the technology. This imbalance further exacerbates the geographical disparity in educational resources.

3. The decisive role of technical training in the effectiveness of applications

Teachers' and students' mastery of technology directly affects their teaching and learning outcomes. However, research has found that most teachers receive only basic operational training and lack systematic instruction for higher-order functions and pedagogical integration. Meanwhile, students often face a steep learning curve in the use of complex technologies, limiting the effectiveness of their practical application.

4. Impact of user acceptance and trust on technology diffusion

Teachers' and students' trust and acceptance significantly affected the diffusion of the AI technology. While most users recognized the basic functionality of the technology, some teachers questioned the tool's professionalism and adaptability to higher-order tasks, while students' trust in the tool was reduced due to inconsistencies between system feedback and teacher comments. This suggests that improving user trust is a key component in future technology rollouts.

Recommendations for future research

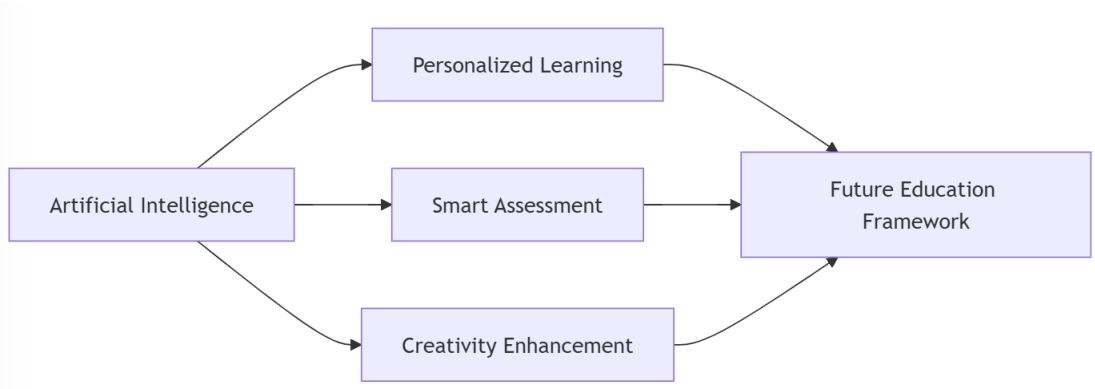

Figure 3 Pathway map of Artificial Intelligence to support education development

1. Optimizing technology adaptation

Future research should focus on developing AI tools adapted to higher-order design tasks and improving the tools' ability to support complex tasks by introducing affective computing and interdisciplinary resource integration techniques. Meanwhile, recommendation

Citation: Bai, H., Sirathanakul, K., & Sokhuma, K. (2025). Artificial Intelligence in Art and Design Education and Challenges: An Exploration of Future Educational Models. Interdisciplinary Academic and Research Journal, 5(6), 647-656;
DOI: https://doi.org/10.60027/iarj.2025.286938

algorithms should be optimized to ensure that personalized learning systems can accurately match higher-order learning content and resources.

2. Promoting resource sharing and universal access to equipment

It is recommended that regional sharing centers be established to share equipment and resources through inter-school cooperation, especially to provide technical support in remote areas and economically underdeveloped schools. The government and enterprises should strengthen financial support for virtual reality equipment and technology in education and lower the threshold of technology use for schools, teachers, and students.

3. Strengthening systematic technical training

Provide teachers and students with a systematic, phased technology training curriculum that focuses on helping teachers master methods of integrating AI technology with curriculum objectives, while designing simplified versions of how-to guides and hands-on lessons for students to enhance their comfort with the technology.

4. Enhancing the technology user experience

Enhance the user experience by optimizing the operating interface, improving the accuracy and stability of feedback, and reducing the complexity of using the technology. Increase faculty and student involvement in the tool, for example, through feedback mechanisms that allow user input to directly influence the optimized design of the tool.

5. Expanding interdisciplinary applications and innovations in educational models

Future research should explore the application scenarios of AI technology in interdisciplinary knowledge integration, especially the combination of art and design with cultural context, sociology, and other disciplines. At the same time, it should promote the innovation of the education model centered on AI and provide new ideas for education reform and student training.

6. Policy support and school-enterprise cooperation

Promote the formulation of special government policies for the development of educational technology, provide funding and resources for schools, and at the same time, encourage enterprises to participate in the research and development of educational technology, so as to accelerate the optimization of technology and the promotion of its application through school-enterprise cooperation.

References

Allen, R. C. (2017). *The industrial revolution: A very short introduction* (Vol. 509). Oxford University Press.

Bughin, J., Hazan, E., Ramaswamy, P. S., DC, W., & Chu, M. (2017). *Artificial intelligence: The next digital frontier*. McKinsey Global Institute.

Citation: Bai, H., Sirathanakul, K., & Sokhuma, K. (2025). Artificial Intelligence in Art and Design Education and Challenges: An Exploration of Future Educational Models. Interdisciplinary Academic and Research Journal, 5(6), 647-656;
DOI: https://doi.org/10.60027/iarj.2025.286938

Chen, P., Li, Z., Zhang, D., Shen, W., Xie, Y., Zhang, J., ... & Guan, Q. (2021). Insights into the effect of human civilization on *Malus* evolution and domestication. *Plant Biotechnology Journal, 19*(11), 2206–2220.

Ertel, W. (2024). *Introduction to artificial intelligence* (4th ed.). Springer Nature.

Flitton, A., & Currie, T. E. (2022). Assessing different historical pathways in the cultural evolution of economic development. *Evolution and Human Behavior, 43*(1), 71–82.

Gong, L., Song, Y., Xu, Y., Wang, M., Ma, H., Liu, W., ... & Hao, L. (2022). The use of a technology-assisted and teacher-supervised online discussion platform to promote academic progress in blended embryology courses. *BMC Medical Education, 22*(1), 817.

Guo, S., Zheng, Y., & Zhai, X. (2024). Artificial intelligence in education research during 2013–2023: A review based on bibliometric analysis. *Education and Information Technologies, 29*(13), 16387–16409.

He, J., Baxter, S. L., Xu, J., Xu, J., Zhou, X., & Zhang, K. (2019). The practical implementation of artificial intelligence technologies in medicine. *Nature Medicine, 25*(1), 30–36.

Jiao, G., Li, L., Deng, H., Zheng, G., Zou, Y., & Zhao, J. (2020, June). Exploration on the cultivation of practical ability of artificial intelligence talents in universities in the context of innovation and entrepreneurship education. In *2020 IEEE 2nd International Conference on Computer Science and Educational Informatization (CSEI)* (pp. 186–189). IEEE. https://doi.org/10.1109/CSEI50228.2020.9142537

Kim, J., Lee, H., & Cho, Y. H. (2022). Learning design to support student-AI collaboration: Perspectives of leading teachers for AI in education. *Education and Information Technologies, 27*(5), 6069–6104.

Popkova, E. G., & Gulzat, K. (2020). Technological revolution in the 21st century: Digital society vs. artificial intelligence. In *the 21st century, from the positions of modern science: Intellectual, digital, and innovative aspects* (pp. 339–345). Springer International Publishing.

Satolo, E. G., Hiraga, L. E. D. M., Zoccal, L. F., Goes, G. A., Lourenzani, W. L., & Perozini, P. H. (2020). Techniques and tools of lean production: Multiple case studies in Brazilian agribusiness units. *Gestão & Produção, 27*, e3252. https://doi.org/10.1590/0104-530X3252-20 *(ใส่ DOI ถ้ามี)*

Sharma, A., & Singh, B. J. (2020). Evolution of industrial revolutions: A review. *International Journal of Innovative Technology and Exploring Engineering, 9*(11), 66–73.

Small, J. S. (1994). *The analogue alternative: A socio-economic history of the analogue computer in Britain and the USA, 1930–1975* [Doctoral dissertation, The University of Manchester (United Kingdom)].

Wooldridge, M. (2018). *Artificial intelligence: Everything you need to know about the coming AI* (Vol. 27). Penguin UK.

Citation: Bai, H., Sirathanakul, K., & Sokhuma, K. (2025). Artificial Intelligence in Art and Design Education and Challenges: An Exploration of Future Educational Models. Interdisciplinary Academic and Research Journal, 5(6), 647-656; DOI: https://doi.org/10.60027/iarj.2025.286938

Zhanqiang, M. (2023). Strategies for cultivating the creative thinking ability of students majoring in educational technology. *Frontiers in Educational Research, 6*(19), 62–66.

Citation: Bai, H., Sirathanakul, K., & Sokhuma, K. (2025). Artificial Intelligence in Art and Design Education and Challenges: An Exploration of Future Educational Models. Interdisciplinary Academic and Research Journal, 5(6), 647-656;
DOI: **https://doi.org/10.60027/iarj.2025.286938**