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THE ROLE OF TEACHER TRAINING IN FACILITATING THE ADOPTION OF DIGITAL TECHNOLOGIES IN ART EDUCATION

Abstract: As technology plays an increasingly prominent role in education, the undeniable need for training programs aimed at equipping teachers with digital technology skills in art education becomes evident. This case study, conducted within the Abai Kazakh National Pedagogical University framework, examines teacher training programs, the challenges teachers face in integrating technology, and art faculty members' learning motivations and preferences. The research employs a descriptive survey, utilizing a questionnaire to collect data. Participants included 25 art professors from the Art Education, Graphic Design, and Visual Arts departments, who responded to questions about teaching methods across three areas: experiential learning, self-directed learning, and institutional learning. The results indicate that the teachers' level of self-directed learning, with an average of 3.7, was higher than experiential and institutional learning. This suggests that teachers are making considerable personal efforts to improve their skills. Additionally, they rated the necessity of institutional training programs as 4.0 (very high), though the challenges they face when using technology were rated at 2.9. The findings reveal that teachers' academic rank influences their perspectives on digital technologies. These insights can help pave the way for educational institutions in Kazakhstan to develop more technology-driven curricula in the future.

Keywords: teacher training, digital technology, art education, educational institution

Introduction

Research has shown that one of the critical factors for improving the performance and progress of students is the quality of teaching and teachers' knowledge (Rowe, 2003). Given the growth of technology and the myriad tools for information acquisition, the teacher is no longer the sole source of information but remains an essential element for student education (Santos et al., 2016). Educators advance professionally by engaging with new learning and teaching methods and incorporating the latest tools and knowledge. Updating and synchronizing with new technologies is crucial for professional development and enhancing the quality of teaching and student learning. With the growing use of technologies in all aspects of life and education, the first step towards the effectiveness of teachers is to have a high level of knowledge in technology-enhanced teaching and the ability to convey information most effectively. In the field of art education, which is no exception and is even more closely related to technology than other subjects, a good teacher must be able to identify and employ the most suitable teaching methods using technologies for each specific art subject. They should be capable of implementing teachings encompassing a wide range of new strategies and technology-enhanced teaching methods. To achieve this, teachers must stay continuously informed about research and engage in ongoing professional development, upgrading their skills and knowledge to integrate the latest tools and technologies into art education.

Background

Technologies have become ingrained in our daily lives, and educational systems, mainly information and communication technologies, can potentially transform teaching and learning methods in the classroom (Lawrence, 2013). While digital technologies are changing all

aspects of life, including education, the literature indicates obstacles to successfully integrating digital technologies in education. Based on past reviews, Balanskat, Blamire, and Kafal (2007) they categorized successful implementation barriers of technology in education into three levels: teacher, school, and educational system (Lawrence & Tar, 2018). They identified and examined factors that positively or negatively influence teachers' acceptance and integration in the teaching and learning process. They created a model for accepting and integrating information and communication technology that considers teacher, technology, and organizational levels. Additionally, Lim and Chai (2008) investigated how teachers are influenced by organizational factors and attitudes toward technology in integrating information and communication technologies into teaching methods. In another study, Sherry and Gibson (2002) suggested that assessing successful integration aspects of technology in teaching methods should examine personal, technological, organizational, and institutional factors.

Problem statement

While numerous studies have been conducted on the role of teacher training in education, the present research focuses on examining the critical role of teacher training in facilitating the integration of digital technologies in art education. In an era of rapid technological advancement, understanding how educators can effectively incorporate digital tools into art education is crucial. Conducted within the specific framework of the Abai Kazakh National Pedagogical University, this research provides an opportunity for an in-depth exploration of the dynamics of teacher readiness and its impact on the adoption of digital technologies in art education. The study delves into the complex dynamics of teacher training and its influence on enhancing the acceptance of digital technologies in art education. By examining various avenues of teacher training, their challenges in technology adoption, and art teachers' motivations and learning preferences, such studies contribute to a broader discourse on integrating technology in education and provide valuable insights relevant to the field. These insights can inform policies and actions at the Abai Kazakh National Pedagogical University of Kazakhstan.

Objectives

The objectives of this study regarding teacher training methods in art for the utilization of digital technologies are multifaceted. In the first stage, this study examines the educational programs and teacher training at the university under study, focusing on how they address the integration of digital technologies in art education. This involves investigating current teaching methods and evaluating teachers' perceptions of these methods. In the second stage, the research attempts to assess the effectiveness of different teaching methods and explore the role of teachers' academic rank in selecting teaching approaches. The third stage of this study delves into understanding the unique challenges instructors face in this context. The following items guide this research:

- Investigating the instructional methods in the training of teachers regarding the utilization of digital technologies in art education.
- Exploring the challenges faced by teachers in the implementation of digital technologies.
- Examining the role of teachers' academic rank as a factor in their preparedness for training courses related to digital technologies.

Ultimately, this study aims to provide targeted recommendations for enhancing teacher training programs at the Abai Kazakh National Pedagogical University by understanding instructors' unique challenges. Additionally, it aims to offer valuable insights that can inform evidence-based policies and approaches, fostering a more innovative and integrated outlook on technology in art education at the university.

Literature review

In a world undergoing a digital transformation, the emergence of digital technologies has brought about significant changes and developments that have impacted all aspects of life, including education. Consequently, in recent years, there has been a growing demand within educational institutions to utilize information and communication technologies for teaching the skills and knowledge necessary for the 21st century. Considerable attention has been devoted to the advantages of digital technologies in education, and numerous studies have examined the progress made in this field (Moreira et al., 2016; Goeman et al., 2015; Lawrence & Tar, 2018). Studies have shown that integrating technology in classrooms significantly enhances the effectiveness of students' learning outcomes (Zhu & Urhahne, 2018).

Pachler et al. (2010) have also identified the need for experienced human resources in institutions, robust infrastructure, and adequate educational support services as external barriers that affect technology integration. Many studies emphasize the importance of teachers as critical factors in facilitating technology integration in education (Backfisch et al., 2021; Scherer et al., 2019; Vongkulluksn et al., 2018).

Paetsch et al. (2023) investigated that teachers are more successful in integrating technologies into their teaching methodologies when they receive support from administrators and colleagues. Additionally, studies underscore the necessity of enhancing teaching skills using digital technologies and improving teachers' competence in technology-based instructional methods (Martin, 2015; Tondeur et al., 2012).

Voogt et al. (2013) declared that digital technologies in education present challenges that have affected educational institutions and teachers, necessitating examining what needs to be learned and creating technology-centric teaching methods. They also attribute the lack of teachers' readiness and the lack of systematic attention to teaching and learning strategies to the reasons for the unsuccessful integration.

According to Joo et al. (2018), teachers with meaningful and positive experiences can incorporate technology into education and show tremendous enthusiasm in demonstrating its benefits. Additionally, general digital skills applicable in daily and social life play a significant role in current models of digital literacy and technologies (Siddiq et al., 2016).

Nikolopoulou and Gialamas (2015) investigated which technology-centric teaching methods teachers find more useful and analyzed the role of teachers in using information and communication technologies in education. However, teachers face challenges in integrating digital technologies into art education methods in the classroom. While educators, especially young teachers, are more exposed to digital technologies and use them in their personal lives, the purposeful use of these technologies for educational purposes appears to be somewhat more complex. Although teachers are familiar with technological capabilities, their competencies and skills in using these technologies are limited (Valtonen et al., 2011). Given recent digital changes worldwide, the importance of this issue has increased, and educational institutions are more engaged in this field, as there is a need for teacher training to prepare them for integrating digital technologies in education (COL, 2020). However, there is still a long way to go for fully integrating digital technologies into educational courses.

Teachers who previously taught in technology-free classrooms are often identified as a group with the greatest need for technology training. However, contrary to popular belief, belonging to a generation that has grown up as digital natives does not automatically provide teachers with the instructional skills for using educational technology. In a study, they reported a lack of readiness to use technology in the classroom, and their teacher preparation program lacked sufficient training on how to teach with technology (Simpson, 2023)

As revealed by the research findings, some of the main challenges in integrating digital technologies into education include a lack of time for learning new technologies, insufficient teacher training, and the need to assess technology-centric teaching methods. Given these

issues, training courses are undeniably essential to educate teachers on the effective use of digital technologies in art education. Since technology plays an increasingly prominent role in our daily lives, incorporating these advancements into the educational landscape is crucial for fostering innovative and engaging learning experiences. In the realm of art education, where creativity and expression take center stage, teachers must equip themselves with the skills and knowledge to effectively utilize digital tools. These training courses serve as a bridge between traditional teaching methods and the evolving landscape of technology, empowering educators to harness the full potential of digital resources. By providing necessary training to teachers, these courses enhance their proficiency in using digital technologies and guide students toward a more skillful and creative learning journey. The necessity for such courses becomes evident as they contribute to the evolution and overall improvement of art education in the age of digital advancement. When teachers acquire expertise and enjoy the process, the entire educational community benefits from these skills and successes.

The Importance of Teacher Training and Professional Development Courses

Teacher training and professional development courses are crucial in using digital technologies to develop teaching methods and improve the quality of art education. Among the critical reasons for training teachers and preparing them for the integration of digital technologies in art education, the following points can be highlighted:

The need to keep up with rapidly evolving technology can lead to job burnout and teacher stress. Improving teachers' skills in using digital technologies can enhance their mental and emotional well-being.

Teachers, as learners, require attention and care similar to students. The need for security serves as a foundation for acquiring new knowledge and skills.

Continuous learning opportunities, regardless of the time spent in the classroom, are essential for teachers to enhance their skills.

Teachers can quickly establish connections with their peers, fostering better learning through group training and collaboration with other educators.

Teachers equipped with the necessary skills and knowledge in the field of digital technologies can provide students with more diverse and engaging learning experiences. By presenting new content and strategies, educational courses enable teachers to familiarize themselves with innovative tools and methods and effectively use them. These courses not only enhance technical skills but also transform educators into more innovative and pioneering thinkers in the field of education. Considering past studies, teacher training occurs through various methods. This study aims to investigate three learning approaches: personal learning, experiential learning, and institutional learning.

Experiential Learning

Teachers can, alongside formal educational processes, observe and analyze other features of technology, such as potential accessibility and innovative capabilities, through life and work experiences (Santos et al., 2016). Another aspect of experiential learning involves testing new digital strategies and technologies that can enhance teachers' education, engagement, and skills. Educators must constantly strive to integrate technologies within the curriculum framework. The readiness of teachers to use digital technologies in the classroom requires an experiential and practical training approach. This method involves teachers' direct experience with various educational tools and technologies. In this regard, educational courses should be designed to allow teachers to become familiar with digital technologies in a practical manner and within simulated environments. These direct experiences allow teachers to experience the necessary skills and techniques for higher efficiency and more effective technology integration in the educational process. Moreover, this approach empowers teachers to practically identify

problems and challenges associated with using technology in the classroom and develop better solutions for integrating these tools into the teaching process.

Personal Learning

Teacher readiness for effective use of digital technologies in the classroom can be enhanced through a focus on personal learning, achieved by voluntarily participating in courses and workshops. This educational approach is based on teachers engaging autonomously and voluntarily in the educational process and familiarizing themselves with new tools and methods using digital educational resources. This instructional method allows teachers to focus on teaching skills and technology-related strategies according to their personal needs and preferences. On the other hand, these teachers will face numerous opportunities for direct and practical experience with digital tools throughout the learning process, increasing their confidence and skills in actively integrating technology into the learning environment. One way to improve teaching skills is to learn from peers with different experiences, expertise, or skills. Teachers can learn a great deal by directly and personally interacting with their colleagues, observing their teaching methods, interactions with students, how they handle challenges, and their problem-solving approaches. Additionally, updating teachers' information and knowledge about lesson content, technology-oriented curriculum, and even global standards are part of the personal education resources for teachers. Although educational institutions also play a significant role in this regard, teachers' personal efforts and motivation in exploring new technologies are highly productive.

Institutional Learning

According to Buabeng-Andoh (2012), contemporary institutions, understanding the impact of new technologies on the learning environment, strive to develop educational curricula in line with innovations and improve their classroom facilities for both students and teachers to bridge the existing gap in technology in education. Furthermore, addressing this issue demonstrates that institutional support is one of the key factors influencing the implementation of technology-enhanced learning. Vannatta and Fordham (2004) stated that teacher trainers and administrators should not only provide extensive training on educational technology but also facilitate the improvement of teaching. Teacher training by educational institutions that have recruited them as their executive force is a fundamental strategy for effectively preparing teachers to utilize digital technologies in the classroom. These institutions are responsible for offering comprehensive and specialized training courses that familiarize teachers with both theoretical and practical aspects of technology integration. Teachers can acquaint themselves with modern tools, methods, and strategies in this process, updating their learning. Additionally, educational institutions can encourage teacher collaboration and idea exchange by providing interactive and collaborative spaces. This approach, besides enhancing skills, promotes flexibility and innovation in teaching.

Methodology

Research design

This research employs a descriptive survey method to investigate the role of teacher training in facilitating the integration of digital technologies in art education. Descriptive methods allow for an accurate depiction of the current situation. Additionally, based on a case study of art teachers in the Department of Art Education and Design at the Abai Kazakh National Pedagogical University in Kazakhstan, the descriptive approach is deemed the most suitable for focusing on the research community and presenting descriptive perspectives. Descriptive methods are among the best approaches for developing tools and examining perspectives that can be useful in the future for devising more effective teaching methods using digital technologies and collecting data for analytical frameworks. This research utilized a questionnaire to obtain more precise information for examining the role of teacher training.

Research population

The research population consists of 25 faculty members (15 women and 10 men) from the Art Education, Graphic Design, and Visual Arts departments at Abai University. Of the participants, six are between the ages of 30 and 40, 5 are between 40 and 50, and 14 are aged 50 and above. The academic ranks of the participants were categorized into three groups: 16 were lecturers, 6 were assistant professors, and 3 were full professors. These faculty members are actively engaged in both theoretical and practical courses in the fields of graphic design, art education, painting, illustration, and music.

Instrument

To achieve the research objectives, a questionnaire was designed to gather detailed information on various teacher training methods in using digital technologies in art education. At the beginning of the questionnaire, it was explained to the teachers that the results of this study would be analyzed solely for research purposes and published anonymously. Participants were asked to provide personal information, including age, gender, education, teaching experience, and other relevant details, to enhance the reliability of their responses. They were also required to sign a written consent form before completing the questionnaire.

The Ethical Committee of the Abai Kazakh National Pedagogical University, Kazakhstan, granted approval for this study on February 24, 2023 (Ref. No. 6) (Appendix 1).

In total, 30 validated questions were developed for the questionnaires, which were distributed online via email and social media to art faculty members. The results were also collected online and organized into Excel tables, followed by SPSS software analysis. The structured questionnaires, designed based on data from previous research, addressed three distinct learning methods: 1) experiential learning, 2) self-directed learning, and 3) learning through organizational training programs. Various aspects were considered when evaluating these learning methods, such as the level of experiential learning in using technologies in art education and whether the participants had experience using digital technologies in their personal lives and classrooms (experiential learning). The participants' effort and motivation for self-directed learning with these technologies and how beneficial they found such learning was also assessed (self-directed learning). Institutional support was evaluated by considering whether the institution provided the necessary resources and support for teachers and classrooms to implement digital technologies, as well as whether the teachers were satisfied with the quantity and quality of the training programs offered by the institution (institutional learning). The first section of the questionnaire collected personal information from the teachers. The second section asked about their experiential, self-directed, and institutional learning levels. The third section examined potential challenges in working with digital technologies. Finally, the questionnaire asked how essential they found training programs for teachers to facilitate the use of digital technologies in art education.

Validity and reliability tests

After assessing content validity, the questionnaire results were collected online and stored on a specialized online survey platform. The collected data were categorized in Excel sheets and analyzed using SPSS software. The reliability of the research was measured separately for each section of the questionnaire using Cronbach's alpha. The data indicated a reliability coefficient of 0.88 for the first section of the questionnaire, which included experiential, self-directed, and institutional learning. Additionally, a separate reliability assessment for the challenges associated with using technology in the second section yielded a coefficient of 0.78.

Research findings

Table 1 Indicators of teachers' learning for the utilization of digital technologies in art education Based on the results of data analysis, as observed in Table 2, the experiential learning

of teachers was measured with an average of 3.6. While they expressed an interest in individual and personal learning using technologies, with an average of 3.7, this learning method had the highest average. In this regard, participants estimated their level of enthusiasm for personal learning to be 3.9, and they also stated that their level of personal learning had been 4.0 so far. Learning through university and educational institutions (meaning the extent to which educational institutions provide learning courses for their teachers) has the lowest average at 3.3. In this domain, participants evaluated the availability of necessary equipment provided by the institution for teaching and learning digital technologies in art classes as 3.2. Additionally, the support and sponsorship of the university for the technology-centric teaching and learning process were measured at 3.3.

Table1

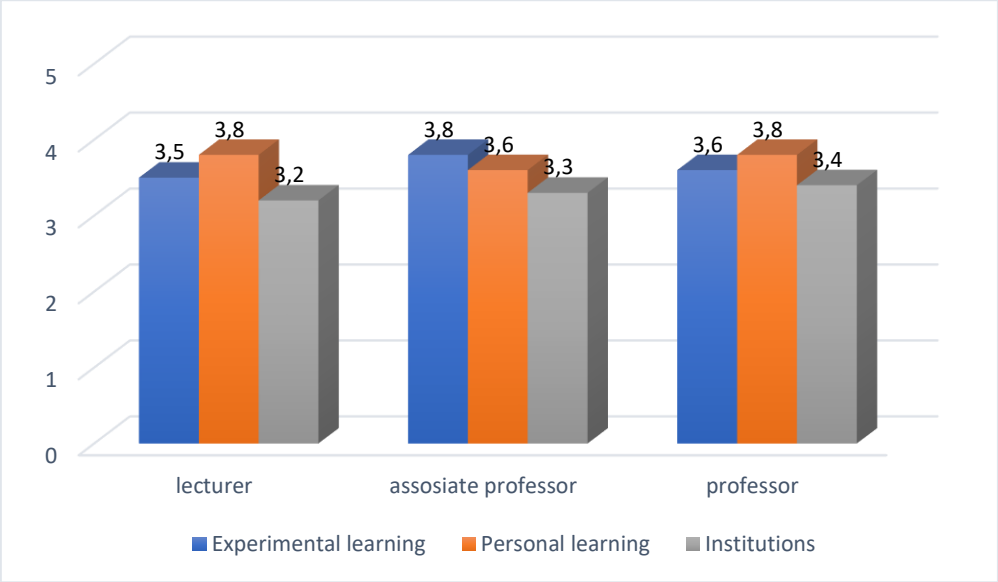
Different approaches to education and training of teachers for the use of digital technologies

Factor	variable	measure	mean	Std. Deviation	Cronbach Alpha
Experiential learning	Experience of using technology in personal life	3.8	3.6	0.66	0.88
	Experience in using technology in the university classroom	3.6		0.64	
	Experiential learning of digital technology application	3.4		0.65	
Personal learning	Efforts to enhance skills personally	3.4	3.7	0.65	
	Level of personal learning	4.0		0.70	
	Level of willingness to learn in person	3.9		0.75	
Learning through institutional training courses	Facilities provided by institutions	3.2	3.3	1.11	
	Courses offered by the institution	3.4		0.82	
	Support and sponsorship from educational institutions	3.3		0.80	

Considering the results in Table 2, a figure was also prepared based on teachers' academic ranks. In Figure 1, the levels of experiential, personal, and institutional learning were measured for each of the three categories of teachers: lecturers, associate professors, and professors. As observed in the figure, teachers with the academic title of associate professor demonstrated the highest level of experiential learning with a score of 3.8. Teachers with the titles of lecturer and professor had the highest learning through personal means. In all three categories of teachers, the lowest average was related to learning through educational institutions.

Figure 1

The amount of teachers' learning indicators based on their academic rank



In the following, to examine the challenges faced by teachers during the technology-centric learning and teaching process, a list of potential challenges was compiled. Subsequently, after summarizing and categorizing this list into three main items, participants were asked in the questionnaire to evaluate the level of challenges they encounter when using digital technologies. In this regard, the level of challenges during the use of digital technology was assessed at 2.6, which was lower compared to other aspects. Additionally, the complexity of using technologies was measured at 3.2, and teachers' skills in solving hardware and software problems were rated at 3.1.

Table 2

Challenges of art teachers when working with digital technologies

variable	measure	mean	Std. Deviation	Cronbach Alpha
Level of difficulties encountered in using digital technologies	2.6	2.9	0.81	0.78
The complexity level of using technologies in art education	3.2		0.57	
Level of familiarity with solving hardware and software problems	3.1		0.68	

Finally, the primary and fundamental question to achieve the research objective was posed to the teachers regarding the necessity of teachers undergoing training courses. In response to this question, Figure 2 has been designed. More than half of the participants have evaluated training courses' importance as very high or high. Participants know the role of introductory training in developing proper methods for applying technology in art education, and they are familiar with their strengths and weaknesses. Therefore, they consider organizing training courses for teachers to be essential.

Figure 2

Evaluation of the necessity of training courses and teacher training by institutions

Table 3

Necessity of training courses and teacher training by institutions According to teachers' academic rank

variable	measure	mean
Lecturer	3.9	4.0
Associate professor	4.1	
professor	4.3	

Discussion

A study conducted by Simpson (2023) explored the fact that even younger teachers from the digital-native generation require training courses. The collected data identified three teacher training methods: experiential learning, self-directed learning, and institutional training. Among these methods, participants across all categories reported lower levels of training through educational institutions compared to experiential and self-directed learning. The results indicate a greater need for institutional training among teachers, revealing a perceived gap in this area. This highlights the importance of including teacher training programs in the use of digital technologies, even for the new generation of teachers. As shown in Figure 1, institutional training was rated at 3.2, the lowest compared to the other methods.

Additionally, a study by Paetsch et al. (2023) demonstrated that teachers who receive support from their institutions and colleagues tend to integrate technology more successfully into their teaching methods, referred to as experiential learning in this research. This trend was particularly evident among teachers with the rank of assistant professor, who reported an average experiential learning score of 3.8, higher than their peers. Meanwhile, teachers with the ranks of lecturer and professor demonstrated higher levels of self-directed learning. As shown in Table 1, self-directed learning was the highest-rated method with an average score of 3.7, experiential learning at 3.6, and institutional learning at 3.3, the lowest of the three

methods. Furthermore, the necessity of training programs provided by institutions was rated at 4.0, emphasizing the crucial role institutions play in supporting digital technology training. Another study objective was to examine teachers' challenges when using digital technologies. Some of the challenges identified included difficulties in implementing the technologies (2.6), the complexity of using these technologies (3.2), and an inability to resolve hardware and software issues related to them (3.1). The overall average for challenges faced by teachers when using digital technologies was 2.9.

While the findings of this study highlight the importance of institutional support in encouraging teachers to use digital technologies, as well as the teachers' needs in this area, education is a multifaceted issue that must be examined from various angles. It is essential to identify and assess other factors that influence this process. Due to the limitations of this study, only academic rank was considered in evaluating teachers' perceptions of training methods and the necessity of using digital technologies in art education. Examining variables such as gender and age could help bridge the gap between digital technologies and teachers' willingness to adopt them.

Conclusions

The primary goal of this research was to identify teacher training methods and their preparation for incorporating digital technologies into art education. Three methods—experiential learning, self-directed learning, and institutional training—were identified, and the second objective involved evaluating teachers' perceptions of these methods. The results revealed that self-directed learning, with an average score of 3.7, was rated higher than experiential and institutional learning. This indicates that teachers are motivated and willing to embrace and integrate digital technologies into art education. However, the lower score for institutional learning highlights the ongoing need for increased support and collaboration from educational institutions in this area. According to the participants, there is a significant demand for training programs to equip teachers with the effective use of digital technologies in art education.

The results from Figure 2 and Table 3 underscore the critical need for well-designed training programs that empower educators to use digital technologies skillfully in art education. Participants rated the necessity of institutional training at 4.0, indicating a high demand. These programs serve as a bridge between traditional teaching methods and the evolving technological landscape, allowing educators to harness the potential of digital resources fully.

The third objective explored the challenges teachers face when using these technologies. Participants rated the complexity of using digital tools at 3.2, while their familiarity with hardware and software issues was rated at 3.1.

The fourth objective examined the role of teachers' academic rank in their views on digital technology adoption and teacher training methods. The findings suggest that assistant professors rated the necessity of institutional training higher than their counterparts, with a score of 4.2.

In conclusion, this study aims to clarify the path of integrating digital technologies into art education, identifying obstacles, and exploring various aspects of this process. The findings can contribute to developing more effective strategies for incorporating digital technologies into art education, offering valuable insights for analyzing organizational and educational frameworks. Moreover, they encourage educational institutions, especially in Kazakhstan, to develop teacher training curricula that focus on the use of digital technologies.

They identify obstacles and explore various aspects of integrating digital technologies into art education. The findings can contribute to developing more effective strategies for incorporating digital technologies into art education, offering valuable insights for analyzing organizational and educational frameworks. Moreover, they encourage educational

institutions, especially in Kazakhstan, to develop teacher training curricula that focus on the use of digital technologies.

Suggestions and Future Implications

The effective integration of digital technologies into art education relies heavily on strategic recommendations and a forward-thinking approach to teacher training. To advance this integration, it is crucial to design and implement comprehensive teacher training programs explicitly tailored to the nuanced aspects of art education. These programs should surpass basic digital literacy, providing profound insights into diverse digital tools and teaching methodologies. Mentorship programs, where experienced art educators proficient in technology can guide and support their peers, would prove highly beneficial. Moreover, advocating for institutional support in terms of resources and policies is paramount to creating an enabling environment for the seamless integration of digital technologies. Future research efforts should focus on evaluating the impact of digital tools on art education and refining evidence-based training programs.

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Competing Interest declaration

No competing interests declared. The authors have no relevant financial or non-financial interests to disclose.

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